

The Newspaper of Information Systems Management
December 28, 1992/January 4, 1993, Vol. 27, No. 1, 150 Pages \$2 (copy \$48 Yearly)

COMPUTERWORLD

FORECAST 1993

NEW

WORLD

D I S O R D E R



WHAT IT TAKES TO THRIVE IN CHAOS

Newspaper

#BXBJFT*****5-DIGIT 48103
#UIV7E300M099039# 1 14118 01
UNIVERSITY MICROFILMS INT 13 ##
UNIVERSITY MICROFILMS INT ##
SERIAL PUBLICATIONS ##
300 N ZEEB RD
ANN ARBOR MI 48103

PERFORMANCE COMPARISON

SYBASE

BEST: 183 TPS

ORACLE7

BEST: 645 TPS

Database Computer Cost/TPS

Transactions Per Second

ORACLE7 Pyramid MServer ES	\$ 10,765	645.1
ORACLE7 Sequent S2000/750	\$ 11,066	619.3
ORACLE7 HP 9000/960	\$ 11,606	578.9
ORACLE7 VAX 9000/640	\$ 6,946	508.4
ORACLE7 NCR 3400	\$ 9,390	312.3
DMS Unsys A16-61E	\$ 43,190	272.5
DMS Unsys 2000/620ES	\$ 43,980	255.7
ORACLE7 DG AXION 620	\$ 7,858	239.1
TPPC95 Unsys 2200/462	\$ 38,053	229.5
Rel VAX 6400	\$ 8,172	208.9
ORACLE7 HP 9000/967	\$ 10,737	184.5
SYBASE Sequent S2000/250	\$ 3,586	183.3
TPPC95 Unsys 2200/442	\$ 27,623	177.3
Informix HP 9000/970	\$ 15,868	173.2
SYBASE Sequent S2000/750	\$ 14,662	168.9
ORACLE7 IBM RSC 6000/969	\$ 11,002	160.3
DMS Unsys 2000/61ES	\$ 43,529	159.4
DMS Unsys A16-61E	\$ 44,320	158.1
ORACLE7 IBM RSC 6000/960	\$ 9,179	157.2
ORACLE7 NCR 3400	\$ 9,045	152.4
Informix NCR 3000	\$ 12,737	150.6
ALLBASE HP 3000/962	\$ 12,963	145.0
DMS Unsys 2000/462	\$ 37,726	133.1
Informix Sequent S2000/750	\$ 22,196	129.1
Informix Unsys 4800/95	\$ 24,410	129.0
Rel VAX 7810	\$ 8,938	123.9
Informix IBM RSC 6000/960	\$ 8,034	120.9
Informix HP 3000/970	\$ 17,783	111.1
ALLBASE HP 3000/967	\$ 8,863	111.1
SYBASE HP 9000/967	\$ 8,323	110.5
SYBASE HP 9000/977	\$ 8,472	110.5
Informix HP 9000/967	\$ 9,717	110.4
Informix HP 9000/977	\$ 8,866	110.4
ORACLE7 Sun 6800P	\$ 12,604	107.2
DMS Unsys 2200/442	\$ 37,468	104.5
Rel VAX 4800	\$ 8,295	103.9
Rel VAX 4500	\$ 8,910	103.1
Rel VAX 6810	\$ 8,455	102.3
Informix IBM RSC 6000/970	\$ 10,730	100.9
Informix NCR 3400	\$ 8,422	100.3

ORACLE7 sets performance records on every computer tested.

These record setting benchmarks were not run by Oracle Corporation. They were run by IBM, Hewlett-Packard, Sequent, Pyramid, NCR and Sun. If performance is important to you, call 1-800-633-1071 Ext. 8103.

ORACLE

SOURCE: TRANSACTION PROCESSING COUNCIL
ALL TPC-A BENCHMARKS OVER 100 TPS

©1991 Oracle Corporation. ORACLE is a registered trademark and ORACLE7 is a trademark of Oracle Corporation. TPC Benchmark is a trademark of the Transaction Processing Council. SYBASE is a trademark of Sybase, Inc. All other trade names mentioned are of their respective manufacturers. Call for product, service, and seminar information. In Ontario or Quebec call 1-800-363-8075, elsewhere in Canada call 1-800-363-8043.

You'd think someone had just invented the word "change," the way it's been flung about this past year. As everyone knows, there's nothing new about it.

There is something new about *how much* change is taking place. For many reasons — not the least of which are new technology, overexpansion in the '80s and an inevitable shrinking of the economy — almost every company and industry will undergo what we've fondly learned to call re-engineering, bottom-up, no hold-barred change, all in the name of better business.

Look at the computer industry. The advent of smaller, more powerful systems has brought some longtime standards bearers to their knees. At the low end, less expensive systems and lockstep market shares have forced suppliers to search for new target markets and more profitable areas of emphasis.

What does that mean for you? It *now* means those three companies in every crisis: fear, uncertainty and doubt. But it doesn't have to. The new rules haven't been established yet, leave for some broad guidelines to be efficient and optimize resources. As threatening as all this can be, it's a prime time to make your own rules.

Now is the time to question everything, dare to rethink and restructure your department, the way you do business, even with whom you do business. There's no looking back — the answers to today's problems lie in future choices, some of which have never been tried, some of which are just starting to get under way.

For those unwilling to let their eyes glaze over in the face of buzzwords, "trends" and paradigms talk, it can be a very liberating age, where there's nothing to stop you from succeeding but your own know-how, innovation and ability to motivate.

There's no question that this can be a threatening time; some of us will opt or be forced to just drop out. And certainly change will come more slowly in some facets of the industry. But to survive the transformation and to help usher in the new era of IS, it's best to be flexible, up-to-date, a little outspoken and very open-minded.

If you're up for the ride, 1993 promises to take IS, its constituency and its suppliers to places where none have gone before.

Mary Grover Brandel
Joyce Chutekian Ferranti
Patricia Keefe

IN FACT...

15%
Percentage of IS departments with "deep" (57%) staff cuts in '92

\$155,000

Average total cash compensation for CIOs in '92

\$203 million

Annual budget of U.S. military funds

\$68 million

Annual budget of the U.S. Advanced Technology Program

+10.3%

Annual percentage change in employment in Silicon Valley '72-'84

-0.7%

Annual percentage change '84-'91

54%

Percentage of IBM mainframe sites planning new host applications in '92

41%

Percentage in '92

21.7 million

U.S. installed base of DOS-based PCs in '90

12.6 million

Predicted U.S. installed base in '94

19

Number of companies still producing software that works with CP/M

1,500

Estimated number of DOS viruses in existence today

Less than 40

Number of Macintosh-based viruses

More than 100

New DOS viruses discovered in summer '92

500,000

Number of mobile data users in '92

5 million

Number predicted in '95

\$10,000

Average amount "hit men" are paid to steal portables from Fortune 1,000 execs

60 cents

Amount a woman earned for every dollar earned by a man in '80

72 cents

Amount she earned in '92

80 cents

Amount she'll earn in the year 2000

1.4 million

U.S. installed base of PCs with graphical interfaces in '90

25.3 million

Predicted U.S. installed base in '94

Sources: Computer Intelligence, The Yankee Group, International Data Corp., Digital Equipment Corp., John May (federal security consultant), The Center for the Continuing Study of the California Economy, "The Joint Venture: Silicon Valley consortium," Computer Select, Perrecher Research, Inc., William J. Harvey, Inc., Gateway Information Services, "The Progressive Review," the U.S. Department of Commerce, Professor James O'Reilly (Shrewsbury College), Shopping the Pastors by Peter G. W. Sims, U.S. News & World Report.



In This Issue

CHANGING BELIEFS

Question everything! Page 6

Cliches and common wisdom aren't all they're cracked up to be. True leaders are looking beneath the surface of popular trends such as downsizing, open systems and outsourcing.

CHANGING STAFF

It's all in the people Page 13

Successful companies are no longer just paying lip service to the importance of teamwork. They are figuring out how to best manage the 55% of the IS budget allotted for human resources.

CHANGING TECHNOLOGY

What's hot; what's not Page 20

Who has time to sift through all the new technologies? We've condensed some of the standouts for the next year — both good and bad.



TECHNOLOGY
PRICES WILL
TAKE YOU FOR
A WILD RIDE.
— Page 46

GREAT TECHNOLOGY FRIBBLES	27
TALK TO YOUR PLANTS	35
THE PRICING GAME	46
UP-AND-COMERS	41
'93 BUDGET WATCH	39
OUR ANNUAL VENDOR PROFILES	67
DUBIOUS DISTINCTION AWARDS	140
PAUL PREDICTS	140

CHANGING ENTERPRISE

Overhaul ahead Page 29

From sales to engineering to finance to manufacturing, every department is using technology differently to change the way they do business.

CHANGING INDUSTRY

On the survival track Page 41

The big guys are shedding pounds. The little guys are bulking up. And those in between are doing just about anything to stay alive in the '90s.

INTERVIEWS



■ Frank Gers, consultant and well-proven "re-covering mainstream bigot," talks about the need to reshape IS. — Page 4

■ Two re-engineering veterans who've been there and lived to tell about it. — Page 16

DESKTOP COMPUTING	77
WORKGROUP COMPUTING	85
ENTERPRISE NETWORKING	93
LARGE SYSTEMS	103
APPLICATION DEVELOPMENT	113
EDITORIAL/VIEWPOINT	72, 73
COMPUTER CAREERS	119
MARKETPLACE	132
COMPANY INDEX	137
NEWS	136, 139



MOST PEOPLE
ARE GETTING
WHAT THEY
WANT FOR
— PAGE 19

A day in the life of an IS executive

Here's something for everyone who's ever had "one of those days," by veteran IS humorist Michael Cohn and illustrator Hal Mayforth. — Page 12

WE WANT A MOORE
OSMIN, BUICT, ORIENTED, INDI-
ANTHORIZED SYSTEM, WHEN CAN
WE HAVE
IT? FROM
1992?

THE
MOORE

Informix Database Technology Helps Kmart Know What Its Customers Want.



When Kmart wanted to move ahead in the highly competitive retail industry, they turned to us, Informix, and our experts in UNIX[®] relational database management systems.

Inventory Control Nationwide.

Kmart needed a fault-tolerant database that linked order entry, price verification, shelf-price updates, and complete inventory control for over 2,500 stores nationwide.

Kmart chose the Informix UNIX-based solution.

Hand-Held, Radio Frequency Computing.

With its new information network, multiprocessors, and hand-held DOS radio frequency computers, shelf pricing and complete inventory control are easily managed in less than a minute directly from the store floor.

The information from the database allows Kmart to make better decisions that help keep products on shelves, give faster check-out service, and keep excess inventory at a minimum—all of which helps Kmart keep a step ahead of the competition.

Kmart and thousands of other companies have called on us for 12 years to successfully handle their critical data.

If you're considering UNIX for data management, talk to Informix.

Because we're the experts.

Call 1-800-898-IFMX.

INFORMIX[®]

THE UNIX DATABASE EXPERTS.

©1991 Informix Software, Inc. Informix is a registered trademark of Informix Software, Inc.
All other names mentioned herein are registered trademarks or trademarks of their respective manufacturers.

Interview: Frank Gens

RE-ENGINEER thymself

RANK GENS LIKES TO POINT OUT that when he began consulting with information systems organizations, some of the big names in end-user computing were Reductron, Wang, Outline Database Systems and Basic Four, the predecessor to MBI Basic Four. That's his way of pointing out that desktop computing has drastically changed the measures of success for IS suppliers and customers alike. During the past 12 turbulent years, IS has had fewer major start-up allies than Gens. At a self-proclaimed "recovering mainframe bigot," as president of Framingham, Mass.-based Technology Investment Strategies Corp., he offers the following advice to IS managers: Don't worry about re-engineering the business until you re-engineer IS and embrace open systems as a core principle.

Q: Is this a good time to build a career in IS?

A: It's a great time. There's barely a corporation out there that isn't looking for ways to conduct business more effectively. The IS organization opens a wide world of possibilities to support those new ways of doing business. But it must aggressively refresh its technical knowledge base in order to handle this role. It [must] address current and future needs while fulfilling existing commitments. This means it must become very good at focusing more resources on high-impact projects, which may mean cutting others.

Q: Should I be comfortable delivering that lower level of service?

A: No, but comfort is a rarity for most senior managers today. Corporate management won't be sympathetic to IS [not doing] something strategic because they were busy taking care of their legacy systems. IS executives are not going to be prepared to take part in re-engineering projects without doing their own internal re-engineering to support new technologies.

Q: Explain "re-engineering IS."

A: Keeping the organization up-to-date on the capabilities of the desktop, particularly the system software, applications and development tools. Today's desktop software has little in common with traditional data center-oriented tools. An obvious one: They have to become more familiar with the desktop, particularly the software. CICS and Cobol don't buy you anything with [Microsoft Corp.'s]

role is to play the lead in redesigning business processes. That's just plain wrong. The IS organization's role is to facilitate, not dictate, business change. That impetus has to come from the executive suite. For now, IS doesn't need to re-engineer business processes; IS needs to re-engineer IS.

Q: Are you saying IS should focus less on business than it has been?

A: The short answer is yes. I'm not saying CIOs shouldn't focus on business, but first things first. When IS gets involved in re-engineering, it has



Visual Basic or [Powersoft Corp.'s] PowerBuilder. A guy who's used to tuning a DB2 environment isn't going to know much about tuning PCs connected on a LAN with a Sybase database and a gateway to the mainframe. While some users may actually know more than IS about these technologies, IS has to make the transition while maintaining a mainframe environment.

Q: Sounds like you think CIOs should focus more on technology.

A: Absolutely. Some CIOs think their

to be prepared to support the project using the best technology available. For a CIO, the most important issue is to back up IS when people claim that service levels are deteriorating so that IS can focus on the more strategic jobs.

Q: How should IS regard outsourcing — as an opportunity or a threat?

A: Outsourcing is a reasonable tactical option for organizations that want to focus their resources. But as a comprehensive strategy, I take a dim view of it. It hobbles your ability to re-

spond to changing business requirements. The re-engineering movement offers tighter ties between IS and business management, and those are impossible to have with a contractor. I think what we're seeing in outsourcing today is a reaction of frustrated senior managers who can't get their new systems built quickly. To me, outsourcing an entire data center is sort of a surrender.

Q: What's going to happen to the downsizing trend?

A: Rightsizing is the thing to think about. It means simply fitting the appropriate technology to the business requirement. It should include a portfolio of options, not just downsizing and client/server but also less politically correct options like mainframe consolidation and tactical outsourcing.

Q: How does IS assert its authority over hostile users?

A: The imperial IS organization doesn't exist anymore. IS is in the influence business, and ultimately end users will have authority over technology. IS will compete with contractors to serve these businesspeople.

Industrywide standards are the best friend of IS. The best of these standards focus on interfaces so users can do their own thing but still achieve that integrated perspective. In building new systems, IS should incorporate interface — not product — standards such as SQL and Posix as much as possible. There isn't a single vendor out there today who can guarantee it will continue to support a given product long-term. If you've got a vendor-independent specification, your long-term risk is very low.

Q: Why is open systems such an important mandate?

A: An infrastructure that minimizes single-source supply is the most important thing IS can build. It reduces the risk of vendor or failure and incorporates new technologies as they come along. If you aren't using an open architecture, then you are underestimating the system's viability long-term.

Q: What will be the most important information technology changes coming up?

A: The most innovative technologies will come from the mass market. Mainframes and disk drives will be built around technologies designed for the desktop. This will open many established environments to new suppliers and threaten the existing suppliers.

Interview by Paul Gilman, Computerworld's executive editor.

YOUR MAINTENANCE BACKLOG IS CONSUMING A LOT MORE THAN TIME.

No one denies the importance of maintaining and enhancing existing systems. They represent an enormous investment of time and money. And remain critical to the operation of most companies. But many IS departments devote so much talent and time to maintenance that they are unable to staff new application development.

Lots of suppliers offer piecemeal solutions, but only KnowledgeWare has a comprehensive strategy to help you streamline maintenance.

KnowledgeWare offers tools designed to dramatically increase your productivity. That allow each programmer to maintain many more applications, whether developed with Integrated

CASE or traditional methods. And to help you optimize investments in existing applications by extending their useful life.

KnowledgeWare's Flashpoint™ is the fastest, easiest way to respond to the growing demand for graphic interfaces. Flashpoint allows you to add GUIs to existing applications. Utilizing Flashpoint's "point and click" style, developers quickly accomplish what used to require hundreds, or even thousands of lines of code. This Windows™-based development tool makes your existing inventory of mainframe and midrange programs more accessible to users and is a practical step toward client/server technology.

Dealing with old, error-prone code is radically simplified with ADW®/Inspector™, Pinpoint™ and Recoder™. These advanced maintenance tools read, analyze and document existing COBOL code. Chart processing paths, highlight potential trouble spots and automatically restructure problem code.

These KnowledgeWare products constitute key elements of our redevelopment strategy. And they are even more effective when combined with our Application Development Workbench®, the most comprehensive full-lifecycle, Integrated CASE development tool set. Our ADW tools enable you to develop high quality, fully-documented software more quickly and easily than ever before.

And we back these superior tools with comprehensive training and support. Call KnowledgeWare at 1-800-338-4130 for all the details. And stop burning up your company's most valuable resources.



KnowledgeWare®

Application Development Workbench and ADW are registered trademarks, and Inspector, Pinpoint and Recoder are trademarks of KnowledgeWare, Inc. Flashpoint is a trademark of Vantage Systems, a wholly owned subsidiary of KnowledgeWare, Inc. Windows is a trademark of Microsoft Corporation. ©1990 KnowledgeWare Corporation. All rights reserved.

Forecast: Changing Beliefs

It's time

to get beyond common wisdom and expose what's behind widely believed myths — even the ones born in the post-mainframe era.

QUESTION everything!



Downsizing, rightsizing, somethingsizing

By Anna S. Rozema

Downsizing is like an airplane rolling down the runway gathering speed for takeoff. The reason it isn't already cruising along at 30,000 feet is simple: The accumulated baggage of 25 years of data processing is proving extremely hard to jettison.

The fact is, the only place that downsizing is going full speed ahead is in the planning stages. Billions of dollars of investment in Cobol code will keep downsizing at many sites to a one-application-at-a-time affair for much of the early 1990s. Moreover, those jet engines in the data center will have to be overhauled before large firms can hope to shut down their mainframes.

Meanwhile, information systems mechanics are rolling up their sleeves and drafting re-engineering plans that could strip off 40% to 50% of the applications now on mainframes by 1996.

Some things will change right away, mostly because of users' needs to rein in the high costs of computing. For every applica-

EXCLUSIVE SURVEY

Most respondents to a recent survey plan to downsize applications in 1993



tion rewritten in C or C++, the cost of software maintenance plummets compared with the cost of maintaining Cobol code. And by reducing new demands on existing hosts, many users will be able to postpone — or cancel — expensive mainframe upgrades.

But mainframes won't be mothballed, at least not in this decade. This and other downsizing myths are explored below:

MYTH: Users are unplugging mainframe dinosaurs.

Even companies that have been downsizing for years are not finished with their mainframes. Two large enterprises, United Parcel Service, Inc. in Atlanta and BankAmerica Corp. in San Francisco, have 10 years of downsizing experience between them, and neither is planning to close their large data centers. Mainframes handle the number-crunching transactions that are the lifeblood of those businesses, while local area networks handle the decision-support and office applications. But mainframe data is often relayed to networked PCs for further analysis.

Changing Beliefs

'It's open - really!'

There's nothing simple about open systems. People really are phasing them in, but in ways vendors may not have imagined

By Maryann Johnson

In the beginning, there were wild-eyed promises and a fondness for overstatement.

Open systems were going to bring about freedom from vendor lock-in and put an end to high-priced proprietary gear. This user-driven revolution was supposed to produce a dizzying array of standardized products, all of which would work together as harmoniously as a celestial orchestra belting out "The Messiah."

Reality is so exasperating by comparison.

"Open systems is still just a buzzword. There's this whole thing about open systems meaning Unix, or relational databases, or object-oriented development or client/server, but those are just examples of tools you can use to get to open systems," says Mark Factor, MIS director at As Doi Pals, Inc. in Boston.

Better safe than sorry

Despite some formidable obstacles, the journey to open systems is well into early implementation of production applications at many Fortune 500 shops. A practical, phased-in approach is the dominant pace plan, however.

Research data from multiple sources often shows that about half those surveyed are steering clear of proprietary systems and opting for cross-platform development tools and standardized operating systems: Unix-based at the server or mid-

range level, with MS-DOS clients.

One interesting trend is that users no longer equate open systems solely with Unix, according to a recent study of 7,000 information systems sites worldwide by International Data Corp.

Reality check

Of 7,000 sites worldwide, 49% said they are pursuing open systems, according to a study published by International Data Corp. Of those, almost half were evaluating their systems altogether, however.

flexibility to change with market conditions. But, as more people deploy open systems, so grows the list of problems users must deal with across multiple platforms. Among these problems are software installation snafus, training costs, coordinated support issues and a spotty selection of high-quality client/server development tools.

Industry analysis at Gartner Group, Inc. in Stamford, Conn., argue that truly open systems — broadly defined as interoperable, portable, vendor-neutral and inclusive of legacy systems — do not yet fully exist.

Users, meanwhile, are standardizing on inter-

EXCLUSIVE SURVEY

Most respondents to a recent survey have a down-to-earth view on what open systems means

Ability of proprietary systems to communicate with one another

36

Ability to develop applications in a common standard

27

Complete interoperability among major national systems

16

Replacement of proprietary environments with Unix systems

8

Other/Don't know

21

Number of respondents: Total: 102 Multiple responses allowed

faces such as Postix that span multiple types of platforms.

Analysis says they expect a slew of vendors to port their proprietary software to many open systems this year.

A prominent harbinger of this trend is IBM's recent decision to port its CICS to both its own Unix (AIX) and Hewlett-Packard Co.'s HP-UX Unix.

"There are some great tools out there, but they all lack a little something," Factor notes. "There's a lot of analysis now with everyone looking for the perfect tool. Only there isn't one."

Still, some of the initial fears about Unix and open systems have evaporated in the past few years, contends Mike Prince, MIS director at Burlington Coat Factory, Inc. in Lebanon, N.H., an early adopter of open systems based on Sun Microsystems, Inc. Unix hardware.

Users are also pleased to find vendors responding with great alacrity to their needs, particularly through strategic alliances.

Some prominent examples include standardized technologies for system and network management — the Distributed Computing Environment and Distributed Management Environment — that are expected to come this year and next year from IBM, HP, Digital Equipment Corp. and others that belong to the Cambridge, Mass.-based Open Software Foundation.

HP is also working with Sun in object-oriented development technology, and DEC has teamed up with Microsoft Corp. to put the Windows NT operating system on its Alpha systems.

Smarts prevail in an era of doubtoutsourcing

By Mark Halper

Outsourcing will become a harder sell in 1993, as chief executive officers and chief information officers learn from the horror stories told by their pioneering peers and start to drive better bargains.

This has already resulted in more than a few myths and fabled traditions about outsourcing either weakening or fading by the wayside.

Some information systems officials and industry observers say the 10-year megatrend will become passé. Others say the emphasis will shift from loyalty to increasingly more flexible terms.

"We believe no major long-term deal signed in 1992 will run its full course," says Ray Maunell, CEO of New York-based consultancy Gateway Information Services, Inc. "Most of the large outsourcing deals are built on yodoo economics," he

People will think twice before handing over the keys to their kingdom.

Reality check

The most majority (60%) of 125 top-15 vendor executives surveyed by Gateway Management Consulting Group said they have contracted out work in the past year. Data processing is the function contracted out most often (46%) followed by finance and human resources, the survey says.

etals, explaining that in reality, costs and needs are impossible to predict more than two or three years out.

Several companies that signed long-term deals in the late 1980s have undergone significant business changes that have led to major revisions of their outsourcing pacts. These changes have been complicated with varying degrees of difficulty.

In one case, New Orleans-based Prepropt McMoran, Inc. replaced its incumbent supplier — Electronic Data Systems Corp. — with a team consisting of IBM's Integrated Systems Solutions Corp. subsidiary Andersen Consulting and Businessland, Inc. In another case, Bank

South Corp. restructured its contract to reflect changes such as its shrinkage sale and a move toward distributed processing [C/W Nov. 2].

"Technology and cost structures change so quickly I can't fathom doing a 10-year deal," says James Petterson, McCaw Cellular Commu-

nications, Inc.'s CEO. While McCaw recently signed a three-year outsourcing removal with Cincinnati Bell Information Systems, Inc. (CBIS), it also plans to gradually unplug the CBIS solution while building its own in-house Unix system [C/W Nov. 16].

"This concept of handing over the keys to the kingdom — we just won't see that anymore," predicts Mary Leidy, an assistant professor of MIS at the University of Missouri.

Yet that concept has paid off for some prudent users. Fred C. Sewell, Bank South's MIS director, says the bank was able to negotiate changes with IBM because of "change provisions" written into the original contract. Another

EXCLUSIVE SURVEY

PC maintenance is the main target of these respondents who said they would outsource next year

Not outsourcing

50%

PC maintenance

20%

New application development

13%

Database maintenance

6%

Other

7%

Percent of respondents: Total: 102

Spilling money is the biggest perceived benefit

Get more done with a lower financial investment

25

Get better computer time utilization

10

Allow you to try more innovative services

5

Get more done in less time

4

Other cost savings that you can't get done

1

Other/Don't know

6

Percent of respondents: Total: 51

"Why's Apple talking to me about UNIX?"



Introducing MacX for Macintosh

Because you probably didn't realize you can now run X Window System applications on a Macintosh.

It's simple and it's inexpensive. And all you have to do is add MacX.

MacX is a seamless extension of the Macintosh operating system that takes only a few seconds to install. It allows Macintosh computers to run X Window System applications concurrently in separate windows on the Macintosh desktop.

Actually, MacX is even better than that. It allows you to run Macintosh and X applications at the same time. And cut and paste informa-


tion between the two as easily as cutting and pasting between two Macintosh applications. Which means now everyone on your system can use the same X applications. Without anyone uttering a single word of confusion.

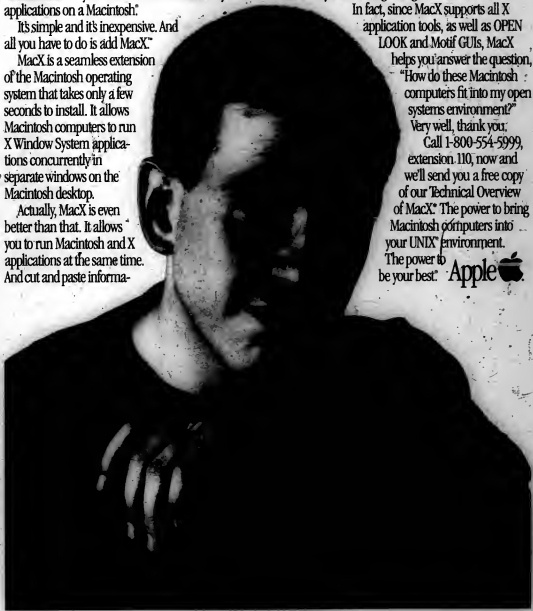
In fact, since MacX supports all X application tools, as well as OPEN LOOK and Motif GUIs, MacX helps you answer the question,

"How do these Macintosh computers fit into my open systems environment?"

Very well, thank you.

Call 1-800-554-5999, extension 110, now and we'll send you a free copy of our Technical Overview of MacX. The power to bring Macintosh computers into your UNIX environment.

The power to be your best. Apple 



Changing Beliefs

Doubtsourcing

CONTINUED FROM PAGE 8

IBM customer, Eastman Kodak Co., also has review clauses in its contract, enabling it to alter its terms and conditions.

However, it's important not to confuse flexibility with ambiguity. Lucy notes that outsourcing arrangements have been

more loosely negotiated in the past, leading to disputes over ambiguities in processing charges. Arguments often arise when a client's use exceeds a prescribed baseline volume or activity and counterpart baseline rates kick in.

Lucy recommends that the two parties carefully establish what constitutes baseline work. Clients should also insist on better reporting measures by the vendor to

help ensure that they are receiving what they are paying for.

In some cases, notes Denny McGuire, principal at Houston consultancy Technology Partners, Inc., CEOs have gotten into trouble by relying too little on the technical knowledge of their CIOs and agreeing to use linked deals they don't understand.

McGuire further notes that customers are "asking vendors to prove they are as

good as they say they are."

Another change under way involves placement or "selective" outsourcing, according to analysts such as Chuck Phillips at Soundview Financial Corp., a Stamford, Conn.-based research firm. For instance, Browning Ferris Industries recently tapped SHL Systems, Inc. for application development and maintenance only.

Users are also beginning to look more for strategic gains, as opposed to financial relief, from outsourcing.

Charles Bibbighausen, a principal at In-source Management Group, Inc., predicts that outsourcing will remain appropriate for companies in a high-growth mode whose "technology demands exceed their ability to attract people who have the talent," and for firms in dire financial straits. His belief is that for any company in between those stages, "outsourcing is unacceptable."

You can evaluate financial software based on its ability to handle functions such as multi-currency, cost allocation and budgetary control or how well it handles multiple consolidations, and whether its accounts payable, purchase order, fixed assets and accounts receivable features are fully integrated and robust, but when you come right down to it the only sure way to evaluate financial software is to go right to the bottom line.

Outsourcing global nets

Global network outsourcing will be hot next year, compared with tepid interest in local-area network outsourcing.

Several of last year's developments will intensify this year, pushing more companies to take the global network outsourcing plunge.

A growing list of major corporations — notably J. P. Morgan & Co. and The Gillette Co. — signed sweet deals under which carriers took over deployment of global networks and agreed to pay financial penalties if service levels fell below a certain point.

These deals should get sweeter next year, and the choices could get broader as BT Synchronic and Advantia, the IBM/Seas, Rovebuck and Co. venture, become major players, and the three U.S.-based long-distance carriers continue their expansion overseas. Two more key changes are expected next year.

•Carriers will begin to offer services enabling users to monitor their own networks' performance while leaving network operations, maintenance and deployment to the carrier. •Overseas carriers are creating one-stop shopping consortia that promise users one contact for troubleshooting, deployment and billing on their global networks. But there is skepticism over whether this is little more than a marketing gimmick.

If it isn't, Aktes Corp., a Seattle-based software maker, is one stop looking for "full accountability for end-to-end service and single-point billing across local and international" links, a spokesman said.

—Elizabeth Horvitz

For more information call Ross Systems at 404-257-9198 Ext. 498.



Ross Systems Inc., 555 Twin Dolphin Drive, Redwood City, California 94065 Phone 404-257-9198 Ext. 498

JCL Emulation On Your Workbench.

Micro Focus PROXMVS MVS Run-Time Environment.



Give your developers JCL on the workstation by adding Micro Focus PROXMVS™ MVS Run-Time Environment to Micro Focus COBOL Workbench™ and they will build production quality applications that can be migrated to and from the mainframe with little or no modification.

PROXMVS allows developers to execute COBOL programs on the workstation under mainframe jobstream control, and use the familiar features they use every day, including MVS dataset names, cataloged/unstream procedures,

SYSOUT facilities, and utilities to test applications.

With an interactive ISPF-like screen system, mainframe programmers can use all PROXMVS features right away. Its jobstream facilities allow JCL to be downloaded from the mainframe and executed without change.

Micro Focus JCL solution manages the MVS dataset names used by JCL, and includes utilities to emulate access method services (IDCAMS), a mainframe compatible sort/merge module, and facilities to handle mainframe IMS and DB2™ dispatcher utilities - all using the same SYSIN control

statements MVS programmers are accustomed to.

Added to the Workbench with CICS™, IMS™, DB2, and 370 Assembler™ Options, Micro Focus PROXMVS gives your developers the most complete and productive mainframe development platform available on the PC.

Call 800-872-6265 today and discover "A Better Way of Programming"™ with Micro Focus.

MICRO FOCUS

Micro Focus Inc. 2805 East Broadway Road, Palo Alto, CA 94303, Tel. 415/350-6101

Micro Focus is a registered trademark and Micro Focus COBOL, COBOL Workbench, CICS Option, IMS Option, 370 Assembler and "A Better Way of Programming" are trademarks of Micro Focus. All other trademarks property of their respective companies.

GSA Contract Number GS00K90AGS9251-PS02.

A DAY in the LIFE of an IS EXECUTIVE



Forecast: Changing Staff

It's all in the PEOPLE

Competitors can quickly duplicate technology, but they cannot as easily match carefully trained and integrated teams of IS people and users.



Future teams

In the future, the best information systems organizations will be populated by self-directed, self-motivated teams in which a traditional supervisor has retreated to an advisory role, says Robert A. Zawacki, 3rd, chief of IS personnel issues.

Taking a cue from Zawacki, Employee Health Insurance, a group health insurer in Great Bay, Wis., is nearing the midpoint of a 24-month experiment on self-directed teams. Its 20-person microfinancing group is now operating without any formal supervisors. The experiment was prompted when earlier suggestions from workers solved several problems that had defied management efforts.

Say goodbye to the lone worker

By Gary H. Anthes

In a real estate, what counts most is "location, location and location." Well, in information systems, the future key to success will be people, people and people.

As attention shifts to serving the end user, IS employees must be more versatile, more broadly trained and empowered to get the job done.

"To anyone who says, 'We're a leading-edge, technology-driven bank, and we have a competitive advantage from that,' I say, 'That's bunk,'" says Webb Edwards, execu-

tive vice president and manager of information services at Los Angeles-based First Interstate Bancorp. Competitors can quickly duplicate technology, be confident, but they cannot as easily match carefully trained and integrated teams of IS people and users.

First Interstate recently consolidated 13 data centers into two, reduced its IS staff from 2,100 to 700 people and lopped \$93 million off its annual IS budget. Pulling that off and positioning the company for a new future required a major overhaul of its training, recruiting and management practices.

What prompted these efforts

were losses from bad real estate loans and the bank's decision to standardize applications, processes and banking products across all of its affiliated, semi-autonomous banks. IS was told to become "a catalyst for a change in culture" for the entire organization, Edwards says. This required IS practitioners to break out of their specialty molds.

"For example, we might have had a guy whose sole job was to oversee the writing of code," Edwards says. "Today, we'd expect him to be involved with the user group, to be involved in planning where that business is going, to be conversant in

Lone worker, page 14

Changing Staff

No rest for help desks

By Kelly E. Sewell

Personal computers will continue to wreak havoc on help desks and anyone else who's in the business of supporting end users. As a result, end-user support groups will become serious businesses.

"There'll be memory and disk space problems that we've never seen before. You'll have a lot of users asking questions about the applications they've installed," says Dave Wortham, store systems manager at JC Penney Co. in Dallas. "Host-based applications don't let you get off course. On a PC, you can get off into never-never land and not know where you are."

As a result, companies without help desks are creating formal end-user support groups, while those with support already in place are buttressing their resources to better serve PCs (see chart).

The best buttress of all is a well-trained help desk staff. You can't recruit entry-level workers only. "There will be increasing demands on the expertise and flexibility of help desk analysts," says Glenn Woodcock, president of help desk consultancy Independent Software, Inc. in Evergreen, Colo. "They're going to have to become more familiar with networks and with all the many different possible future models with small systems interconnected in networks."

Best companies will have to invest in a three-aggressive education program for their end-user support representatives. That training has to be more in-depth than what the average user gets. "I had one help desk person tell me, 'How can I give them any support?' We receive the same training they do!" says Ron Munn, chairman of the Help Desk Institute in Colorado Springs.

It also means elevating the stature of the help desk worker. These staff members should play a more active role in choosing which products get implemented. "The help desk is where the expertise lies with regard to supportability and ease of use," Woodcock says.

When a help desk can't support a product or isn't staffed properly, end users tend to go straight to specialists—that is, to highly paid professionals. "That impacts an organization's productivity if the investments aren't made at the help desk level," Woodcock says.

Investments in technology also need to be made. "Help desks are going to be relying on tools—expert systems, knowledge bases, CD-ROM information bases," says Fred Schreengost, director of the Help Desk Institute. "There's also going to be a demand for vendors to put together troubleshooting, diagnostic software with common failure scenarios to disseminate to help desks."

These would be helpful for any support organization because problems in a PC environment tend to be very repetitive.

As he begins the new year, Wortham has a couple of wishes for the help desk: "We want to make our solution database available to users so they can attempt to solve their own problems. We're ready to do it, we just need approval at this point."

EXCLUSIVE

SURVEY

Most respondents to a recent survey said they plan to ramp up end-user support programs



Percent of respondents
Total: 102

Automated tools are the preferred method to accomplish that.

Add automated tools such as problem management, incident management, voice response and call distribution systems

51

Add staff

22

Other

10

Number of respondents
Total: 75
Multiple answers allowed



Bill Stigebauer, president of LSI Systems Associates, Inc., started a major downsizing effort to eliminate a redundant. The new system integrates imaging, their maps and servers to create a flexible environment that helps and users better perform their jobs. And most importantly, "I want to help train 'supporters' that will be able to take on many functions that were previously performed by system personnel," Stigebauer says.



R. William Eason, COO and senior vice president of LSI Systems Associates, Inc. in San Francisco, Eason has succeeded in building financial and company headquarters to get products to customers. Currently, he is involved in creating a unique organizational structure based on a circular rather than hierarchical organization chart. "Action" groups focus on tasks related to the business, such as customer service of business systems, rather than departmental operations.

It's time for true team spirit

Now that integration is the rule, IS teams are forming

By Garry Ray

Now that integration is rampant and one-stop shopping is a thing of the past, information systems departments need to develop systems integration teams to cover what used to be handled by one or two major vendors. That includes all the new technologies and products spawned by decentralized computing—from analysts to hardware.

Decentralized systems "get rid of

the old vendor lock-in and provide tremendous leverage," says David Cowley, vice president and service director of desktop computing at Meta Group, Inc., a Westport, Conn., consultancy. "But with that comes a new degree of complexity."

How do you establish in-house systems integration teams? Launch training opportunities for IS staff members in small, pilot projects. At one Missouri company, "A small group from the old information center is now the internal systems integration staff," says Joe

Haspel, senior associate at the Center for the Study of Data Processing, a nonprofit consortium of 35 IS shops based at Washington University in St. Louis. The team found that small, pilot projects were the best way to train staff on new technologies.

"They're coming up with about projects, such as [downsizing] mainframe applications that shouldn't have been there in the first place," Haspel says.

Another alternative is to group

Lone worker

CONTINUED FROM PAGE 13

businesses complex."

Employers Health Insurance in Green Bay, Wis., has also lowered its IS people in the business suits—not as part of a dramatic upheaval but simply as a means of improving quality. IS workers at the group have been given six- to 12-month "subsidies" in new departments, says Ken Pomeroy, vice president of HRI.

The relationship isn't one-sided. Pomeroy says users need to better understand IS.

Employers

Health is about

to kick off a new

program in

which seven or

eight IS manag-

ers, selected from IS ap-

plicants, will be

assigned to business

units to educate user

management on the

application of auto-

mation. "The idea is to go out and preach the

gospel according to St. Technology," Pomeroy

says.

Reality check

Nearly half of IS

professionals will

increase their training

budget this year. Only

7% will decrease it.

LANs, PC development

and working with end

users dominate the

subject matter.

team needs to work, each individual in the team needs to feel empowered—that he can take a difference.

Empowerment was once "just a word" at AT&T Transmission Systems, according to Constantino Lambros, a technical staff member. But as part of a successful, three-year quest for a Malcolm Baldrige-National Quality Award, the AT&T business unit greatly beefed up its training programs, set up quality teams throughout the organization and put empowerment into practice.

The result: AT&T realized an estimated 30% improvement in the quality of its software after the quality team diagnosed and fixed recurring problems in a key software module.

your vendors into a systems integration team. Theresa Doyle, vice president of information services at the Dean Whittier Reynolds Equity Research Department in New York, gained cooperation from a number of vendors and service providers, which now participate in conference calls and meetings to discuss integration issues at their company.

"I really wanted them to work to-

gether and to be on friendly terms," Doyle says. But, "It's been a learning process to get vendors to work together and learn each other's products." The benefit?

"If they make a change to one system, they know how it affects another," she says.

Internal teams cover systems integration.

**Because There Are More of Them
Than There Are
of You...**

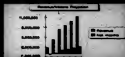
Business Planning

Less Project Risks

Financial Analysis/Reporting

The
SAS®
System

for Information Delivery



EIS



The CEO needs visual checks on all the factors critical to the success of the business. The CFO wants a "small" change in the financial reports. The marketing VP is anxiously awaiting pricing models. And they're *still* waiting for inventory and quality-monitoring systems out on the factory floor. How can one IS manager—with so little time, so few resources, and so many budget constraints—meet the diverse needs of so many clients? The answer is the SAS System for Information Delivery.

Integrated Applications for Enterprise-Wide Productivity

Unlike stand-alone solutions—which drain your software budget and drive up training and support costs—the SAS System gives you a cohesive, enterprise-wide application strategy. One that fits the needs of the executive suite, the manufacturing floor, and everywhere in between. One that supports cooperative processing across hardware platforms. And one that responds immediately to new or shifting applications demands. Virtually any application that involves accessing, managing, analyzing, and presenting data is available within the SAS System's information delivery environment.

Call Today for a Free Video Preview of the World's Leading Information Delivery System.

See for yourself why the SAS System is the only software you'll ever need. Give us a call at 919-677-8200 for your free video preview. Also ask for details about the free SAS System Executive Briefing...coming soon in your area.



SAS Institute Inc.
Software Sales Division
SAS Campus Drive ☐ Cary, NC 27513
Phone 919-677-8200 ☐ Fax 919-677-8123

SAS is a registered trademark of SAS Institute Inc. Copyright © 1992 by SAS Institute Inc. Printed in the USA.

Quality Improvement



Data Visualization



VOICES of EXPERIENCE

If you haven't been involved yet in a reengineering project, chances are you will next year. To prepare you for the huge change this brings about, Senior Editor Nell Margolis asked two veterans to relate their experiences — mistakes and all.

Kimberly-Clark Corp. backed into re-engineering, says former Chief Information Officer John Kohler, who headed up the successful first stage. Here's how: Several years ago, the consumer products industry underwent "a fundamental cost shift," he says.

Large retailers were shuffling inventory management costs off their books by "allowing" suppliers such as Kimberly-Clark to take over that function. The new responsibilities did increase the amount of data processing re-

quired but did not result in more revenue. Kimberly-Clark's once-innovative and profitable manual-entry, sequential-

step order-entry set-up suddenly became an unaffordable luxury.

Kohler, now a partner at the Chicago-based system integration firm Technology Solutions Corp., says Kimberly-Clark set up a steering committee to orchestrate the overhaul of all of the firm's order-entry systems and processes.

The re-engineering effort was on its way.

I thought the hardest part of re-engineering would be managing change. In retrospect, my first assumption was right on the money!

Everyone on the organization has to change.

Change comes naturally to executives, so they forget that it will come with great difficulty to the rest of the organization. And that miscommunication costs a lot of dollars in retraining.

At Kimberly-Clark, a lot of people found their jobs changing without having any concrete idea of what the changes were going to be. So an atmosphere of fear and dislocation grew up.

If we executives had been very up front, first about the fact that jobs were going to change and then about exactly what we intended to do with the surplus people and how and why, the company could've saved wear and tear and dollars.

This is perhaps the most important lesson from the re-engineering front: be open. Communicate. Not once in a while, not when it's comfortable but early, often — every chance you get.

On one project, we moved the accounts payable processing operation from Wisconsin to Texas because the work could be done more cost-effectively out of the Waco facility. Understandable reason, right?

But nobody told the people involved why it was happening, so employees were stumbling around say-



ing, "What is this thing? A dog or a pig?" Nobody knew what they were looking at.

The moral, again: Spit it out. If you're going to re-engineer, recognize that you need a very strong change agent.

That leads directly to another critical reality: The change agent isn't someone who's going to win a lot of popularity contests. Nobody likes disruption, and few like the person who instigates it.

It's a good idea to make sure the change agent is someone who isn't necessarily planning to be here after the changes are done, an outside consultant, maybe, or a seasoned executive nearing retirement.

It's in the nature of the job. Where management sees a hero, employees further down the ladder are go-

ing to see The Terminator.

I remember one instance at K-C in which we had a manufacturing cost system that was scheduled to be re-engineered. The guy put in charge of [the project] was a fellow with a brazen personality, determined to drive the changes and brook no opposition. Manufacturing was never brought into the plans; the game plan was communicated only by directives issued on a need-to-know basis. The re-engineering never happened.

The ideal change agent will be someone who will be able to take the aggressive skills that got him chosen for the job in the first place and tone them down a little. Right now, these folks are in short supply. Finding the right change agent may be K-C's biggest challenge for 1993.

JOHN KOHLER

"If we executives had been very up front, the company could've saved wear and tear and dollars. This is perhaps the most important lesson from the re-engineering front: be open. Communicate. Not once in a while, not when it's comfortable but early, often — every chance you get."

Changing Staff

FENCE

Coining of the term "re-engineering" is generally credited to management guru Michael Hammer, but Cigna Corp. Chief Information Officer Raymond Caron may well go down in information systems history as one of the first to turn the word into action.

Caron's ambitious attempt to align Cigna Systems with the business goals of its reinsurance business, Cigna RE, met near-legendary success, resulting in a 52% head count

reduction, a 1,200% transaction time improvement and a 42% operating cost reduction. Today some 20 re-engineering projects are afoot at the firm. Senior Vice President Erich Schaffer was in charge of the Property and Casualty Division when the re-engineering bandwagon pulled up at the door with its cargo of promise—and problems.

Schaffer recognized early on that "we had to find a different way of thinking about what we were doing or else be stuck with a work-dark juggernaut."

"That led him to the 'team training' concept, which in turn, he says, is leading him and his teammates through an unscripted and often painful re-examination of how they act and work."

The first problem you hit when you start team training isn't that nobody wants to do it. It's just the opposite: Everybody believes they're already working as a team. That's the beginning of the process of unlearning, which can be pretty traumatic stuff.

For instance, before, I thought of myself as a manager. I thought my job entailed top-down direction and lots of reports and meetings.

Suddenly I'm not a "manager"—I'm a "coach," and I'm supposed to be "guiding" rather than "controlling." You're used to having three or four levels of people reporting to you, and overnight, all that's gone. Tell me you're not going to feel dislocated.

This brings you right up against the issue that's key to the success of a transition to teamwork: rewards.

Like virtually all companies, our rewards have traditionally been based on individual contribution. In 1985, for instance, Say you were working on a unique project and came up with a creative way to do it: you might get extra money over and above your salary.

But now you're part of a team. All the old rules are off. Uh-oh—so are the old rewards. Bawling your colleague to the punch got you a bonus; bawling your teammate to the punch is meaningless, if not bad.

If there's no way at all to get rewarded, people aren't going to accept the team concept. But if you preach teamwork and keep rewarding individual action, you're attempting the impossible. The only choice left is to come up with an entirely new reward system. That's what we did, and why.

Under our old structure, each individual was reviewed periodically, based on a five-grade performance system, basically, I meant that you walked on water and 5 meant that you poisoned water.

No way could that system be adapted to the team model. So we threw away the grading system. All the numbers went away. So did individual reviews. Now an entire team's effort is considered as one performance. It works just the way it does in sports: gives stronger players an impetus to help weaker ones improve, and on the other hand, if you're not pulling your weight, you have to live with knowing you brought down the whole team.

What else went away? Huge chains of control that created middle-management layers. For instance, our research, testing and training department used to test code. This was replaced by a soup-to-nuts development process that requires the people who developed the code to test it and the business partners for whom it's being developed to be involved at every step.

Great? Sure—for the developers, for the users, for the end product. But you can see why re-engineering is very threatening to large groups of people: If testing is taken out of

the mix, how do they fit in? The fact is, some don't.

And there's another hard part of the re-engineering process: layoffs. This issue isn't pretty, it isn't nice, and it isn't going to go away. You've got to face up to it and do what you can to reduce the pain.

One thing you can do is to have metrics in place well before you start so that you can really take your best shot at eliminating inefficiencies and redundancies. As you start teams, for instance, start doing a lot of surveys because you have to know what's working and what's not.

Another is, be completely open about what you're doing and when and why. Both of these—metrics and openness—increased understanding.


One of the teams we started out with was an administrative team. It performed a lot of business-oriented IS functions. By and by, the folks from the business side with whom the IS team was working didn't need it anymore. But, awful as that is, everyone on the team understood that they weren't needed anymore because they had been kept in the information loop all along. They saw it as a natural evolution.

Let everybody know what's going on. That's part of the meaning of teamwork. If you hear that and think, you've learned a lot.

"Suddenly I'm not a 'manager'—I'm a 'counselor,' and I'm supposed to be 'guiding' rather than 'controlling'... But now you're part of a team. Beating your colleague to the punch got you a bonus; beating your teammate to the punch is meaningless, if not bad."



AS/40C



Royal Caribbean propels its
business with AS/400s.

Maybe you should make some
waves of your own.

Royal Caribbean knows that a perfect cruise requires expert navigation in more ways than one. Every detail from booking a stateroom to the vintage of the champagne is equally important. Only a truly open computer system can sail smoothly through so much data on so many disparate platforms.

No matter what industry you're in, the IBM AS/400® can give you the openness and interoperability you want, and more. AS/400s let Royal Caribbean communicate with multivendor systems used by travel agents, airlines, food service companies and many other suppliers. Their AS/400s also connect them with an internal UNIX® network that gauges the profitability of each sailing and manages their passenger services, too.

The AS/400 supports virtually every industry communications standard, including newly emerging ones. And it protects your investment in software, peripherals and training while giving you the flexibility to pick the best and brightest from a portfolio of thousands of software solutions. No wonder so many successful companies in all kinds of industries have AS/400s on board. For a free copy of a consultant's report, "The AS/400: In a Class by Itself," call 1 800 IBM-6676, ext. 731.

The IBM AS/400.
Success isn't complicated.

- AS/400 lets you connect to virtually any platform.
- Subscribes to industry-standard communications protocols.
- Attractive financing plans available through IBM Credit Corp.
- IBM service and support mean you never feel lost at sea.

IBM

Forecast: Changing Technology

WHAT'S

HOT



WHAT'S

NOT

A LOOK AT WHAT TO AVOID AND WHAT TO FOCUS ON IN 1993

The battle for the desktop

By Christopher Lindquist
and Rosemary Caffaro

What we have here is a battle with no winners—and no losers, either.

Yes, after all the coverage and hype about who will win the 32-bit desktop war, this year might just see the market roughly split between IBM's OS/2 and Microsoft Corp.'s Windows NT and still leave more than crumbs for Unix to mop up.

"The phenomenal success of MS-DOS in the 1980s created the expectation that the same kind of dominance [by some operating system] would appear in the 1990s," says David Rothchild, an analyst at Piper, Jaffray & Hopwood in Minneapolis. "I don't think that's going to happen."

Instead, he says, the market will likely frag-

ment into "Big Blue" shops running OS/2 2.0, "Bill Gates is God" shops running Windows NT and "academics" running Unix. What users will buy also depends in large part on the immediacy of their situation.

"If you're looking at the future, it's probably NT or Unix. If you're looking at the present, it's OS/2 or Unix," he says, noting that NT's portability and multiprocessor support give it a huge advantage over OS/2 for users looking several years out.

In terms of users creating real applications, Unix and OS/2 2.0 will likely be further along in 1993 than Windows NT, primarily because OS/2 prototypes began in 1982 with shift to production mode this year, and Unix has been building up its own steam for some time now.

That might give the impression that Unix and OS/2 have the advantage, but "remember, Microsoft has shipped 20,000 [now 30,000] NT SDKs so far," says Tim Bajarin, president of Creative Strategies Research International, Inc. "If it

What's hot, not, page 24



WE HAVE
FRAME RELAY
FOR THE WAY THIS
COMPANY
DOES BUSINESS



AND
THIS
ONE

AND
THIS
ONE

AND
THIS
ONE

AND
THIS
ONE

AT&T InterSpan™ Frame Relay Service different ways different

Maybe you see a company just like yours in one of the pictures above. Probably not. Because the truth is, no two companies are exactly alike. That's why AT&T InterSpan Frame Relay Service solutions are designed to fit the individual needs of your corporation.

Maybe you're looking for more

flexible bandwidth, better LAN-to-LAN connections, or more efficient connectivity. InterSpan Frame Relay Service offers all of that, plus AT&T's national and international network that allows for seamless interworking of applications.

From the initial planning stage through implementation, InterSpan

Services' specialists will work with you to help you make the most of frame relay and evolve your network.

And because InterSpan Frame Relay Service is standards-based and works with multiple protocols and different vendors' equipment, your current investment is protected.

To help you manage your net-



AND
THIS
ONE

AND
THIS
ONE

AND
THIS
ONE

AND
THIS
ONE

offers solutions to match the companies do business.

work, AT&T InterSpan Frame Relay Service even offers you a realtime "window" that lets you monitor and optimize your network configuration and performance.

It's all part of the InterSpan Data Communications Services family of high-quality, innovative data connectivity solutions designed

to make it easier to link people, locations and information. We work with you to meet your exact business needs.

So if you want a frame relay solution that's designed for your company rather than someone else's, call your AT&T Account Executive or 1 800 247-1212, Ext. 621.



AT&T

The right choice.

CONTINUED FROM PAGE 20

ruging OS/2, says George Oliven, manager of information delivery technology. The bank has several OS/2 2.0-based applications that are scheduled for a "very, very early deployment," he says.

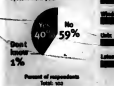
Many users express an interest in evaluating Windows NT upon shipment, but few have definite plans for it at this point. Dean Wittler in New York plans to evaluate Windows NT as a platform for real-time research analyst workstations, says Theresa

Whether Windows NT or OS/2 will provide them with reason to change remains to be seen.

"We're not Unix big-ots at all, just powerful desktop system big-ots," says Harry Perrin, assistant vice president of Investment systems at Teachers Insurance Annuity Association in New

EXCLUSIVE

Most respondents to a recent survey will not standardize on a new desktop operating system next year.



100

York. Even though the vast majority of his department runs on Unix, Perrin says he could be persuaded to switch to something like Windows NT — if the advantage was significant and if it was ported to the Sun Microsystems, Inc. Scalable Processor Architecture (SPARC).

Until then, Perrin is keeping his stakes in Unix and looking to Solaris as his means of entry to perhaps less expensive platforms such as Intel Corp., while still retaining his current SPARC investment.

Greg Feeler, information systems manager at Employer's Resource Corp., said he is less likely to switch from his version of Unix. The Santa Cruz Operation's SCO Unix. The system handles payroll for 4,000 to

5,000 employees, and "when paychecks don't happen like they're supposed to, tempers get short" so reliability is key. Peeler is looking to other operating systems for potential use in 1995 but is more inclined toward OS/2 than Windows NT. He says he sees a hybrid environment in his future, with Unix running custom database software on

No matter who chooses what, it's clear that we're talking big applications here. These 32-bit operating systems will most likely be running reliable line-of-business applications that take advantage of the speed and multitasking capability of these robust operating systems. These could be graphical front ends to on-line transaction processing, real-time multiprocessed stock analysis workstations or multimedia

"You don't really need a 32-bit operating system for spreadsheets," says Judith Hurwitz, president of Hurwitz Consulting Group in Newton, Mass. She says the focus will be on database-driven application de-

development, customized applications that can take advantage of 32-bit data paths and memory capacities.

As pieces fall into place and lines are more sharply drawn, the battle will swing from the vendor's to the user's turf as decision-makers face their own internal struggle: selecting which 32-bit environment is right for them. ■

81 000 000 224

In 1992 Computerworld readers
spent **\$81 Billion** on
Information Technology – representing nearly
half of all IT spending in 1992.

COMPUTERWORLD

Changing Technology

Groupware is in; pens are out

GROUPWARE

HOT

Everyone, it seems, will be getting into groupware computing this year. Many users will take first steps with pilot programs, while scores of software and systems companies will put a groupware spin on their products.

More established workgroup players will add expanded functions to their base platforms, including imaging, better text management and, later in the year, videoconferencing.

David Marshak, a senior consultant at the Patricia Seybold Group in Boston, says vendors will incorporate functions such as "shared screens" in software to allow remote workers to make changes in an application and view them in real time.

Meanwhile, the Big Three desktop software companies are expecting this year to be a big one. The schedule is as follows: Lotus Development Corp. will ship Lotus Notes Version 3 in the first half of this year. Among other features, it will include better text management and retrieval via technology from Verity, Inc.

Microsoft Corp. will be pushing ahead with Windows for Workgroups and expects dozens of supporting third-party products to ship.

Borland International, Inc. is scheduled to ship the first piece of its workgroup strategy, Object Exchange, in the first half of the year. Borland has yet to fully explain how this will allow its applications and other vendors' to be shared by groups of users.

Also watch for "smarter" workgroup software, such as Beyond, Inc.'s BeyondMail, which can be tailored to users' needs. Lotus is working on similar, "smarter" technology designed to allow "agents" to filter mail and information to an individual's requirements.

IBM has outlined several possibilities for OS/2 with workgroup extensions. It will likely ship a version of OS/2 with basic peer-to-peer networking capabilities, which was demonstrated at Comdex/Fall '92 in November. —Rosemary Cutugno

Many hot technologies in the coming year will be those that focus on changing the way businesses get things done.

NETWORK MANAGEMENT

After much vapor and many promises, vendors should finally start shipping some products to enable users to manage their local-area networks as well as inter-LAN, internetworking backbones in an integrated, centrally coordinated manner.

Centralized LAN systems managers, such as IBM's LANtView, purport to monitor, configure, troubleshoot and download software to LANs from a single OS/2 server. LAN analysis and simulation tools say extending across the wide-area network to pinpoint bottlenecks and trouble spots across a LAN-to-LAN connection.

IBM, Cabletron Systems, Inc. and Digital Equipment Corp. will ship products designed to

integrate management of the LAN network and IBM's Systems Network Architecture.

Expert systems, icons that change color and automated "discovery" mechanisms

will proliferate as a way to farm out network management tasks to less technical users and save on management gruntwork. Breakthroughs to watch out for in the standards arena include the following:

"The Open Software Foundation should finalize its Distributed Management Environment protocols by year's end."

"A new version of Simple Network Management Protocol will emerge in products with security features. LAN protocol independence and manager-to-manager communications."

—Elizabeth Horvitz

HOT

Network management products finally can talk to each other.

IMAGING

Not exactly sluggish but not as big as projected, the electronic document imaging industry may be due for a shakeout among its 200-plus vendors.

Sale from any fallout in the boisterous PC local-area network segment of the market. While hardware and software are standardizing, third parties will concentrate on providing application solutions. We might even see some new players appear.

Items to watch in the PC LAN category include the following:

• Lotus Development Corp.'s Notes: Document Imaging, the companion product to Notes, developed in conjunction with Eastman Kodak Co.

• Kodak's image extensions to Novell, Inc.'s NetWare.

• Microsoft Corp.'s groupware entry is due in '93; however, it will not have imaging capabilities in its first release.

Also, Microsoft's anticipated

Windows NT debut will give PC LAN imaging vendors a salable platform for client/server products.

However, it's the workgroup category, which consists mainly of four- to 15-user imaging systems, that will account for the highest growth in the marketplace, according to BIS Strategic Decisions in Norwell, Mass. It estimates that the current \$1.35 billion market for imaging hardware, software and support will grow to \$1.1 billion by 1995.

Also slated to arrive this year are the following:

• Work-flow software — which automates the routing of images between individuals and applications — will increasingly break off into its own category. It will fit into users' process re-engineering and redesign efforts.

• Lots of inexpensive "personal imaging" products. These are intended for stand-alone PCs outfitted

with a scanner, a fax board and (for the heavy fiber) an optical disc drive. A big worry for information systems departments will be the scalability of these generally nonstandard products.

Important technical strides made last year in optical character recognition (OCR) will bear fruit this year with mature applications. OCR will let users absorb forms and documents more easily by distributing national indexing.

Forms recognition scanners and software that recognize different kinds of images, apply the proper OCR and then send the result to one or more applications. Insurance companies, for instance, have several kinds of forms sent to patients and care providers. A single system able to recognize and route different forms to different applications would boost productivity by eliminating what is still a largely manual task. —Ellis Boker

HOT

Imaging systems will be able to handle more complex tasks.

Ask not for whom the bell tolls... It tolls for those who think that their ability to live open, their ability to open...

OS, IBM. This year could get the last sale on OS's rights as the "official" industry standard. Not that OS, or Open Systems Interconnection, is dead; growth could be \$240 in sales and profit. But in network management and interconnection OS has been losing ground steadily to SNMP and TCP/IP.

Add the Internet Engineering Task Force will have completed the first draft of standards, which reportedly will many of the functions that critics say made their previous inferior.

Not The Internet. While the standards are slowly complete for FDDI-2 — the long-hoped Fiber Distributed-Data Interface (FDDI) successor for carrying voice, video and data traffic — it is limited to be implemented by Asynchronous Transfer Mode (ATM) this year, a revolution in technology on the lips of the industry.

"FDDI-2 is a big fat year," says Janet L. Hyman, a director at Perimeter Research, Inc., a Cambridge, Mass.-based research firm. "The main benefit is to carry voice and video, which is exactly where ATM is positioned."

ATM also adds benefits such as gigabit speeds (FDDI-2 tops out at 100M bps/sec.) and the potential to use dedicated LANs and WANs into a single entity.

ADVANTAGE CHECKED ON ADVANCE is IBM, COBRA, OMO, DOE. Maybe vendors down the road those would be distributed object standards will really move on, that there's still no agreement on what this object-oriented stuff really is or how it fits into the standard-issue IT shop.

As one analyst says, "The Object Management Group that's setting the standards is out to lunch. The standards to specify for the Common Object Request Broker are so loosely defined, it's completely meaningless."

Guts by IBM. Networking by ComputerLand.



The IBM PS/2® Model 77 486 has the brains and brawn to tackle the toughest jobs. It packs a double-chip 486DX2 66/33 MHz or powerful 486SX 33 MHz processor. So you get extra-fast completion of processor-intensive tasks.

Need to add new functions? Four slots and four bays make it easy. Plus, there's an XGA®-2 graphics adapter for the most sophisticated display performance resolution and color.

The IBM PS/2® line of new premiere computers was designed to be networked. From deep within its guts. And no source is better at networking these killer IBM® systems than ComputerLand®

We've designed and installed ten times as many single and multi-vendor networks as anyone—almost as many as everyone else combined. Including over 22,000 in 1991 alone.

We have more than 550 IBM-certified network engineers—more than anyone else in the business. (Many of our competitors actually brag about a measly 10 or 15.)

ComputerLand®

And, frankly, if it has to do with networks, we can do it. Design. Configuration. Maintenance. Integration. Host connectivity solutions. Management. Just name it.

To get the rest of the scoop about ComputerLand and the powerful Personal System/2 products, contact your local ComputerLand branch. That doesn't take guts—just smarts.



Changing Technology

AI is out; objects are in

It's often difficult for busy information systems professionals to sift through the vendor hype and provide generalizations to focus on what really works.

So Computerworld's staff went right to the source in the know — your peers — to find out which technologies and methodologies promise the best return on investment.

WIRELESS. At Tyco R U, Inc., radio frequency technology is the thing to watch, according to Dennis Hesley, vice president of MIS at the Paramus, N.J.-based company. Hesley says the chain is consolidating adding wireless point-of-sale devices to its outlets.

Until recently, Tyco R U and other retailers required a Federal Communications Commission license to transmit inventory and store data to the company's data center, which Hesley says was needlessly bureaucratic. But the advent of spread-spectrum technologies, which enable users to transmit data using wireless communications systems, means data transfer is faster and so FCC licenses are required.

ELECTRONIC DATA INTERCHANGE (EDI). Texas Instruments, Inc. has already reduced shipping errors by 80%, reengineered 70% of the firm's clerks and produced 80% on-time delivery and 70% cycle-time improvement — thanks to EDI, says Ralph Fygnick, vice president of corporate IS and services.

486 CHIP. 486-based PCs represent "a tremendous price break in the market," according to Julie Gardland, senior vice president at New York's Lehigh Brothers. "The 486" has let us look more at operating systems like Windows because it makes those operating environments much more usable."

Gardland adds that the 486 chip has also made it possible to introduce client/server applications, Windows applications and graphical user interfaces.

OBJECT-ORIENTED

Users will turn up the volume on object-oriented technology in 1993, as more of them use the C++ and SmallTalk languages to write new applications — and rewrite old ones.

In many cases, objects are being put to work in corporate downsizing and re-engineering efforts. Some sites are even turning to object-oriented "wrappers" to "hide" procedural code by encapsulating it as an object. Wrapping is one way users hope to accelerate re-engineering projects without rewriting legacy Cobol programs.

Last year, many large corporations, including American Airlines and CSA Corp., deployed object-oriented pilot applications as production programs.

This year, many others, such as

Citicorp and Levi Strauss & Co., plan to begin development of new client/server applications in object-oriented languages.

However, many commercial sites have placed object-oriented programming (OOP) on the sidelines, waiting for the learning curve to get somewhat easier.

To spur OOP projects at more corporate sites, several vendors shipped application development frameworks with loop-based user interfaces last year, including ParcPlace Systems, Inc.'s VisualWorks and Digital, Inc.'s Parla.

Object-oriented databases got off to a slow start in the early 1990s, with just a handful of vendors sharing \$50 million in worldwide sales.

To some extent, many large users

are waiting for relational database vendors to support objects, which would make database servers more versatile.

Some object-oriented database management system firms, such as Versant Object Technology Corp. and Servio Corp., made joint marketing alliances with several relational database management system vendors.

In general, object technology has been hampered by a lack of standards. However, the Object Management Group in Framingham, Mass., is working on several, while the International Standards Organization committee in Europe is working on SQL 3, an SQL database query language that supports objects.

—Jean S. Rowman

MULTIPROCESSING

The PC multiprocessing market will develop considerably this year, but it still needs to build user trust and vendor consensus. Users will start to develop multiprocessing applications in hopes of garnering big savings over mainframes and minicomputers.

A major step in its shift this year from Unix toward a more desktop-oriented environment. Some of the key advances include the following:

- Windows NT from Microsoft Corp. If delivered as expected, NT will give the market a multiprocessing application development environment.
- Multiprocessing extensions for OS/2.
- Pentium, Intel Corp.'s 1495 follow-on, combined with its recently announced Advanced Programmable Interrupt Controller, will give users mul-

tiprocessing-optimized hardware platforms.

Hardware vendors will fight to bring some semblance of standards to the hardware market in terms of bus architecture and overall systems design. Systems security and management features will also mature this year, with help from companies such as IBM, Compaq Computer Corp. and AST Research, Inc. — Michael Fitzgerald

PORTABLES

In an attempt to pull more functionality and better communications in a small package, portable computer vendors are starting to experiment with the traditional categories, such as "palmtop" and "notebook." We'll see more personal digital assistants, a la Apple Computer Inc.'s Newton, as well as hybrid pen/key-board machines. Grid Systems Corp.'s Gridpad Convertible, which combines pen-input and two-way notebook computer, will likely have competitors.

Notebooks remain the only sure area for big growth. The biggest trend will be the push for wireless communications, such as cellular and radio frequency modes. Credit-card-size devices following the Personal Computer Memory Card International Association standard will give notebook users the ability to add various functions to their notebooks, such as memory, fax and modem capabilities.

—Michael Fitzgerald

UNIX

Unix operating systems are geared up to wage desktop war against Microsoft Corp.'s Windows NT — and to a lesser extent, IBM's OS/2.

Intel Corp.'s Pentium chip will be a hot spot for Unix, especially for Solaris and Unix System Laboratories, Inc.'s (USL) Unix System V 4.2. Another desktop market force, and pending threat to Unix workstation, vendors will be PowerPC products from the alliance of IBM, Apple Computer, Inc. and Motorola, Inc.

Based on IBM's RISC System/6000 Power RISC architecture, the PowerPC venture aims to produce a

family of next-generation reduced instruction set computing microprocessors competitive with those

from Hewlett-Packard Co., San Microsystems, Inc., Digital Equipment Corp. and MIPS Technologies, Inc. (now part of Silicon Graphics, Inc.). PowerPC products will start arriving toward the latter part of the year.

There will be fewer industry alliances along the lines of last year's PowerPC consortium or HP's Precision RISC Organization. The appearance of more system and net-

work management software — which already tops the IS "must have" list — is a given for 1993, along with a plethora of distributed computing tools and applications. This should also prove to be a make-or-break year for the Open Software Foundation's (OSF) Distributed Computing Environment.

Users will also see vendors paying a lot more attention to branding and certification programs for Unix products, from organizations such as SPARC International, USL and the OSF. — Marilyn Johnson

Only One Software Covers Every Desktop Strategy

The SAS® System The World's Leading Information Delivery System

Windows? OS/2? UNIX?

The debate rages on over which desktop operating system is best. Fortunately, the question of which software to choose has been settled once and for all. All you need is the SAS System.

What's more, the SAS System is portable across all your hardware. Our exclusive MultiVendor Architecture™ lets you integrate different desktop platforms (who says you have to choose?) and share data and applications between the desktop and larger machines. So, while the industry struggles to define a standard operating environment, we've eliminated the need for one.

And cut out the expense of buying—and supporting—all those stand-alone desktop solutions. See for yourself in a free video. Just give us a call at 919-677-8200.



The world's leading information delivery system provides a single, cohesive, and cost-effective solution for virtually any applications request. From executive-level information systems to total quality management systems for the manufacturing floor. Customized interfaces make it easy for anyone—at any level—to gain immediate productivity.



Call Now for a Free Video Introduction

With the SAS System, you can rely on a single software system for Windows and/or OS/2 and/or UNIX and/or any other platform.



SAS Institute Inc.
Sales & Marketing Division
SAS Campus Drive □ Cary, NC 27513
Phone 919-677-8200 □ Fax 919-677-8123

SAS is a registered trademark and MultiVendor Architecture a trademark of SAS Institute Inc., Cary, NC, USA. Other brands and product names are registered trademarks or trademarks of their respective holders. Copyright © 1993 by SAS Institute Inc. Printed in the USA.

Forecast: Changing Enterprise

Overhaul AHEAD

'Re-engineering'
means different
things in
different parts
of the
enterprise.
Here's how key
departments
will use technology
to change the way
they work.



Serve or else

By Mitch Betts

Slowly but surely, corporate America is learning that the customer is king, and the king is very demanding. He wants one-stop shopping from multidivision companies; easy-to-get status reports on what's happening with his order and super-efficient transactions over the telephone.

In 1992, a few pioneers started to invest in the broad range of technologies that can help meet those demands, but in 1993 the rest of the pack will have to stop paying lip service to customer service and open their pocketbooks. "Extraordinary customer service" will be the key to whether some companies survive or die in the 1990s, says John Tychohl, president of the Service Quality Institute in Minneapolis.

Faced with this business mandate, chief information officers are digging into their bag of technology tricks and pulling out such familiar applications as electronic data interchange (EDI),

imaging and work-flow software to speed up the processing of customer transactions.

But progressive CIOs will have to go beyond conventional data processing and embrace a variety of less familiar technologies, too, including fax servers and voice processing.

"Because customers like one-stop shopping, for example, San Antonio-based United Services Automobile Association (USAA) has a single toll-free number backed by a voice-processing system that directs customers to USAA's various business units, including auto, fire and life insurance and mutual funds.

"We're committed to a one-company image, despite our diversified services," says Charles Cockerell, director of telecommunications, office and voice systems.

Another customer-focused company is Carolina Freight Corp. in Cherryville, N.C., which is using a whole family of technologies to give customers a window into the trucking company's operations. The business goal, simply put, is to make it easier for customers to do business with Carolina Freight than with its competitors, says John Rudasill, president of the firm's computer services subsidiary.

The company's suite of technologies includes

an EDI network for its high-end customers, a PC-based software package for midsize customers and a voice-response system that allows smaller customers to use a push-button phone to access the shipper's computer systems.

The voice-response system provides information about rates and routes and even allows customers to trace their shipments by the waybill number, Rudasill says. Customers can also get a shipment status report faxed to them.

That capability has emerged in the last few years, thanks to a new breed of computer-based fax systems from vendors such as Optus Software, Inc. in Somerset, N.J.; Brooktrout Technology, Inc. in Needham, Mass.; and Bivcon, Inc. in Billerica, Mass. The fax servers allow companies to send price lists, product details and advisories from their computer databases to customers' fax machines.

The technology is red hot. In 1980, the number of installed computer-fax systems is expected to double, and 15% of all local-area networks will have a fax server, according to Cammaro Research in Fairfield, Conn.

Because so much business today is conducted over toll-free telephone lines, another hot technology is "computer/telephone integration."

Serve, page 30



**CUSTOMER
SERVICE**

Changing Enterprise

Beyond laptops and notebooks

Real-time access to data will be key for on-the-roads and office-bound sales teams seeking on-the-spot decisions

By Joanne M. Wexler and Michael Fitzgerald

Most large sales departments have equipped their sales teams with portable computers. Now they're ready to go a step further: On-the-roads and office-bound users alike will be given the tools to slice and dice corporate information quickly, keep inventory on shelves and stop fiddling with paperwork.

Sales forces will also enter "virtual office" mode, with real-time access to corporate databases and messaging systems, users say. The enabling technologies will include the following:

- Smaller, more powerful portable computers with communications enhancements.
- Groupware applications.
- Interactive, platform-independent databases.
- Pin-based systems.
- Wireless wide-area networks.

This is the year that New York Life Insurance Co. says it can finally implement its plan to serve customers more quickly. The company wants traveling agents to be able to set up hypothetical situations with potential customers and perform actuarial calculations on the spot.

To do that, the insurer plans to use database tools that will automatically link data entered into one program with all its other programs, says Richard E. Nelson, vice presi-

dent of agency systems.

New York Life tried this three years ago but aborted the effort in the face of ineffective tools. However, with vendors such as Borland International, Inc. likely to enhance their products with interactive characteristics, Nelson says this could be the year to resurrect the project.

Ryder Systems, Inc. is simply looking to "put more people on the street with real-time access to corporate information," says Henry P. Flallo, group director of corporate telecommunications at the Miami firm.

Remote wireless communications will be a key enabler, Flallo says, and will be spurred by such recent developments as a nationwide wireless messaging network from RAM Mobile Data. RAM Mobile aims to cover 90% of the urban business population with its wireless packet data network by June.

The emergence of wireless personal communications networks—

which will designate a "phone number" to a person rather than a place—should also help, he says.

Clothing manufacturers have their own issues to deal with these days: shorter product cycles and increased garment volume. This makes it impossible to complete a physical garment sample for every show floor, explains Michael Higgins, technical support manager at Ryer California, a San Francisco-based company.

The company plans to leverage terminals based on the X Window System—a high-resolution graphics-oriented protocol—to electronically send high-quality photographs of a garment to retailers "within hours of a day so we can sell



SALES AND MARKETING

directly from the picture," Higgins says.

The photos will be transmitted by a RT frame-relay network, he added.

Back in the office, salespeople at Ryer have also found a way to leverage X systems. Higgins has set up a configuration that merges text with pictures of garments on to users' X terminal screens. The text is stored on SQL databases running on Sequent Computer Systems, Inc. minicomputers, and the photos reside in a magnetic optical jukebox. The setup allows users to visually identify garments and intelligently discuss a larger product set with customers, he says.

SALES AND MARKETING

• **PERSONAL COMMUNICATIONS NETWORKS** will include wireless units, including pagers, beepers, and mobile phones, enabling on-the-go access to corporate databases and messaging systems.

• **WIRELESS WIDE-AREA NETWORKS** will be a key enabler, Flallo says, and will be spurred by such recent developments as a nationwide wireless messaging network from RAM Mobile Data. RAM Mobile aims to cover 90% of the urban business population with its wireless packet data network by June.

The emergence of wireless personal communications networks—

which will designate a "phone number" to a person rather than a place—should also help, he says.

Clothing manufacturers have their own issues to deal with these days: shorter product cycles and increased garment volume. This makes it impossible to complete a physical garment sample for every show floor, explains Michael Higgins, technical support manager at Ryer California, a San Francisco-based company.

The company plans to leverage terminals based on the X Window System—a high-resolution graphics-oriented protocol—to electronically send high-quality photographs of a garment to retailers "within hours of a day so we can sell

directly from the picture," Higgins says.

The photos will be transmitted by a RT frame-relay network, he added.

Back in the office, salespeople at Ryer have also found a way to leverage X systems. Higgins has set up a configuration that merges text with pictures of garments on to users' X terminal screens. The text is stored on SQL databases running on Sequent Computer Systems, Inc. minicomputers, and the photos reside in a magnetic optical jukebox. The setup allows users to visually identify garments and intelligently discuss a larger product set with customers, he says.

the ability to work in real time, wireless networks connect providers with customers, and salespeople with each other.

For example, IBM's Data Network, by example, which is working with several software developers for management applications for managing networking, intends to increase service from 24 hours to 24/7.

IBM's Data Network, by example, which is working with several software developers for management applications for managing networking, intends to increase service from 24 hours to 24/7.

IBM's Data Network, by example, which is working with several software developers for management applications for managing networking, intends to increase service from 24 hours to 24/7.

Serve or else: Customer service key in '93

CONTINUED FROM PAGE 29

Approaches to improved service

LOOK FOR THE FOLLOWING developments in customer service technology in 1993:

- **THE TRAVELERS GROUP**, plans to implement a text-to-speech application that will inform calls of Travelers-approved doctors in their area.
- **CLARITY, INC.** in San Jose, Calif., recently introduced client/server software to help large customer service organizations provide technical support and track complaints and product defects. Field service and inventory management modules will be out in the first quarter.
- **PRODUCTIVE SOFTWARE, INC.** in Mountain View, Calif., has developed client/server software for customer support throughout an enterprise. The first module for help desks is shipping (EW, Oct. 12), and other modules for sales, marketing and engineering departments will be forthcoming, the company said.

When consumers call that 800 number, they can get either a voice-response system that extracts information from a computer system or a live operator who has immediate access to the customer's files.

One of the pioneers is The Travelers Corp. in Hartford, Conn., which has both types of systems. "I'm absolutely convinced we have to do this because customers are going to expect it. Otherwise, they're going to think something is wrong with us," says Gus Bender, vice president of telecommunications.

Travelers has 12 applications running on 50 voice-response units,

which now handle 30% of the company's incoming calls. Callers use their telephones to get status re-

sponses on their latest insurance claims and check eligibility for benefits.

If the caller then needs a live operator, Travelers uses "automatic screen transfer" technology to ensure that the caller and the caller's computerized records arrive at the customer service agent's terminal at the same instant. Customer

service does not have to identify themselves once again, which shaves 20 seconds off each call.

Firms entering the world of voice processing must make sure the "scripts" of instructions and prompts through which callers must navigate are user-friendly and that a live operator is just a button away.

Otherwise, the system will backfire and become a real customer turn-off.

Exhibit 1 shows how to use the system. The system is designed to be used by a live operator or a live operator is just a button away. Otherwise, the system will backfire and become a real customer turn-off.

More Up-to-the-Minute News!

51 Issues for ~~\$48~~ ^{ONLY} \$38.95

Yes, I want more. I accept your offer of \$38.95* for 51 weekly issues. That's a savings of over \$9.00 off the basic subscription rate. Plus, I'll also receive my Desktop Calculator FREE with my paid subscription.

PCCode 87

First Name M Last Name

Title Company

Address

City State Zip

Address Shown: ☐ Home ☐ Business ☐ New ☐ Renewal Basic Rate \$48 per year
 *U.S. Only. Canada \$74.95. Central/South America \$120. Europe \$135. All other countries \$205. Foreign orders must be prepaid in U.S. dollars.

Please complete the information below to qualify for this special rate.

- 1. BUSINESS/INDUSTRY (Circle one)**
 - 1a. Manufacturer (other than computer)
 - 1b. Processor/Computer/Peripherals Dealer
 - 1c. Wholesaler/Reseller/Printer
 - 1d. Business Service/Consultant
 - 1e. Government - Business/Service/Printer
 - 1f. Government - Business/Service/Printer
 - 1g. Government - Business/Service/Printer
 - 1h. Government - Business/Service/Printer
 - 1i. Government - Business/Service/Printer
 - 1j. Government - Business/Service/Printer
 - 1k. Government - Business/Service/Printer
 - 1l. Government - Business/Service/Printer
 - 1m. Government - Business/Service/Printer
 - 1n. Government - Business/Service/Printer
 - 1o. Government - Business/Service/Printer
 - 1p. Government - Business/Service/Printer
 - 1q. Government - Business/Service/Printer
 - 1r. Government - Business/Service/Printer
 - 1s. Government - Business/Service/Printer
 - 1t. Government - Business/Service/Printer
 - 1u. Government - Business/Service/Printer
 - 1v. Government - Business/Service/Printer
 - 1w. Government - Business/Service/Printer
 - 1x. Government - Business/Service/Printer
 - 1y. Government - Business/Service/Printer
 - 1z. Government - Business/Service/Printer
- 2. TELEFUNCTION (Circle one)**
 - 2a. Chief Information Officer/President/VP
 - 2b. Chief Information Officer/President/VP
 - 2c. Chief Information Officer/President/VP
 - 2d. Chief Information Officer/President/VP
 - 2e. Chief Information Officer/President/VP
 - 2f. Chief Information Officer/President/VP
 - 2g. Chief Information Officer/President/VP
 - 2h. Chief Information Officer/President/VP
 - 2i. Chief Information Officer/President/VP
 - 2j. Chief Information Officer/President/VP
 - 2k. Chief Information Officer/President/VP
 - 2l. Chief Information Officer/President/VP
 - 2m. Chief Information Officer/President/VP
 - 2n. Chief Information Officer/President/VP
 - 2o. Chief Information Officer/President/VP
 - 2p. Chief Information Officer/President/VP
 - 2q. Chief Information Officer/President/VP
 - 2r. Chief Information Officer/President/VP
 - 2s. Chief Information Officer/President/VP
 - 2t. Chief Information Officer/President/VP
 - 2u. Chief Information Officer/President/VP
 - 2v. Chief Information Officer/President/VP
 - 2w. Chief Information Officer/President/VP
 - 2x. Chief Information Officer/President/VP
 - 2y. Chief Information Officer/President/VP
 - 2z. Chief Information Officer/President/VP

(Please specify)

More Desktop Computing!

51 Issues for ~~\$48~~ ^{ONLY} \$38.95

Yes, I want more. I accept your offer of \$38.95* for 51 weekly issues. That's a savings of over \$9.00 off the basic subscription rate. Plus, I'll also receive my Desktop Calculator FREE with my paid subscription.

PCCode 87

First Name M Last Name

Title Company

Address

City State Zip

Address Shown: ☐ Home ☐ Business ☐ New ☐ Renewal Basic Rate \$48 per year
 *U.S. Only. Canada \$74.95. Central/South America \$120. Europe \$135. All other countries \$205. Foreign orders must be prepaid in U.S. dollars.

Please complete the information below to qualify for this special rate.

- 1. BUSINESS/INDUSTRY (Circle one)**
 - 1a. Manufacturer (other than computer)
 - 1b. Processor/Computer/Peripherals Dealer
 - 1c. Wholesaler/Reseller/Printer
 - 1d. Business Service/Consultant
 - 1e. Government - Business/Service/Printer
 - 1f. Government - Business/Service/Printer
 - 1g. Government - Business/Service/Printer
 - 1h. Government - Business/Service/Printer
 - 1i. Government - Business/Service/Printer
 - 1j. Government - Business/Service/Printer
 - 1k. Government - Business/Service/Printer
 - 1l. Government - Business/Service/Printer
 - 1m. Government - Business/Service/Printer
 - 1n. Government - Business/Service/Printer
 - 1o. Government - Business/Service/Printer
 - 1p. Government - Business/Service/Printer
 - 1q. Government - Business/Service/Printer
 - 1r. Government - Business/Service/Printer
 - 1s. Government - Business/Service/Printer
 - 1t. Government - Business/Service/Printer
 - 1u. Government - Business/Service/Printer
 - 1v. Government - Business/Service/Printer
 - 1w. Government - Business/Service/Printer
 - 1x. Government - Business/Service/Printer
 - 1y. Government - Business/Service/Printer
 - 1z. Government - Business/Service/Printer
- 2. TELEFUNCTION (Circle one)**
 - 2a. Chief Information Officer/President/VP
 - 2b. Chief Information Officer/President/VP
 - 2c. Chief Information Officer/President/VP
 - 2d. Chief Information Officer/President/VP
 - 2e. Chief Information Officer/President/VP
 - 2f. Chief Information Officer/President/VP
 - 2g. Chief Information Officer/President/VP
 - 2h. Chief Information Officer/President/VP
 - 2i. Chief Information Officer/President/VP
 - 2j. Chief Information Officer/President/VP
 - 2k. Chief Information Officer/President/VP
 - 2l. Chief Information Officer/President/VP
 - 2m. Chief Information Officer/President/VP
 - 2n. Chief Information Officer/President/VP
 - 2o. Chief Information Officer/President/VP
 - 2p. Chief Information Officer/President/VP
 - 2q. Chief Information Officer/President/VP
 - 2r. Chief Information Officer/President/VP
 - 2s. Chief Information Officer/President/VP
 - 2t. Chief Information Officer/President/VP
 - 2u. Chief Information Officer/President/VP
 - 2v. Chief Information Officer/President/VP
 - 2w. Chief Information Officer/President/VP
 - 2x. Chief Information Officer/President/VP
 - 2y. Chief Information Officer/President/VP
 - 2z. Chief Information Officer/President/VP

(Please specify)

COMPUTERWORLD

PCs in short supply



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144



Changing Enterprise

Hold down that fort

By Jean S. Bozman

As information systems managers try to reduce their feared backlog of Cobol applications, they should look toward the exit door of the central computer room.

That's because a sizable amount of this year's development will be done near the glasshouse but within corporate business units. There, end users will work directly with programmers to develop new applications.

The localization of application development makes eminent sense because field personnel are at the front lines of any business. And certainly the rapid proliferation of end-user programming tools and locally installed local-area networks and databases has accelerated out-bound development.

With users now able to easily prototype their own applications and graphical user interfaces, why push in central IS when you can better be done at local sites?

IS is beginning to sense that their lives might be easier if they handle the corporate infrastructure and let the business units handle

more of the development," says Neal Hill, a senior analyst at Forrester Research, Inc. in Cambridge, Mass.

IS organizations already committing to this vision of decentralized development include DHL Airways, Inc., Fidelity Investments, Levi Strauss & Co. and Kasha-Kerry Food Stores, Inc. Armed with technologies such as fourth-generation languages, object-oriented tools and relational databases, the intrepid programmers-at-large may travel to business units for a short time — or take up permanent residence.

"We make the information available in a centralized data repository, but we want [each unit] to have its own operational views of that data," says Donald Chaney, manager of advanced research and development at DHL Airways, an international shipper based in Redwood City, Calif.

Need for structure

That's a theme that is now beginning to be heard throughout corporate IS: Provide guidelines and



data structures for the organization, and let local organizations do what they will within the central structure.

But users and IS managers alike must beware: There are many pitfalls to business unit programming in a vacuum. The business units are more purely driven by day-to-day profits, but they are also out of the direct sight of IS," Hill says.

Applications developed in one business unit may not work reliably against another business unit's database. Without the benefit of central-site advice and counsel, those roving developers could give rise to chaos.

A mediating role

To prevent chaos, information systems directors will be summoned to mediate disputes, set standards and oversee the IS infrastructure as it becomes a shared resource.

"There has to be a balance between the LAN's ease of use, common user inter-

As users take on more development work, IS needs to keep an eye on the corporate infrastructure.

face and local data via the [central] data center's control, security and data integrity," says Evan Wilde, director of information systems at Nissan Motor Corp. in Gardena, Calif.

To lend that oversight, many IS managers will return to computer-aided software engineering (CASE) tools to fashion approved corporate data models and to get a fix on information flows throughout the organization.

Although many in IS have become disenchanted with CASE, it may provide the bird's-eye view needed to create their high-level information models.

"You don't want stand-alone, non-integrated systems that don't give you the big picture about your business," Wilde adds.

Setting corporate standards for data types and formats and where that data will be located will become paramount concerns for IS.

Stamping for standards

IN A DEVELOPMENTAL recommendation for object-oriented Cobol standards will emerge from the Object-Oriented Cobol Task Group of the ANSI X3.14 committee. Object-oriented Cobol will offer a wholesale evaluation of applications to determine which should be "reengineered" for redevelopment in new systems.

THE OBJECT-ORIENTED CASE will get a new lease on life as commercial tools become widely available for IBM's AS/400 Workstation/Access. Existing standards will drive CICS and software engineering into the Unix arena. This will come as a relief to firms launching complex client-server efforts because standards and compatibility among CASE tools will make it easier to model information flows and structures within an organization.

THE OPEN GROUP'S COMPARISON Distributed Computing Environment will gain wider acceptance in commercial end user applications, paving the way to deliver widely distributed and client-server applications.

Dealing with chaos - and learning to love it

By Gary Ray

Object-oriented, client/server, rules-based systems, relational databases, CASE: The array of new and old technologies for corporate development can be dizzying.

But hold onto your seat belt because this year promises to unleash more technologies in a frenzied pace.

Even more difficult for information systems managers will be the intricate job of wedding together a raft of new and old software systems and technologies and redeploying applications on a variety of platforms.

"The dirty little secret of client/server technology is that you have to embrace complexity," says Neal Hill, a senior analyst at Forrester Research, Inc. in Cambridge, Mass.

"I think people are overwhelmed now," says John Morrell, senior Unix systems analyst at In-

The new technology frenzy will continue, but you can cope if you take it one step at a time.

ternational Data Corp. in Framingham, Mass. "They should focus on what they're trying to build and not get too complex about it."

Keeping it simple, though, is more easily said than done. Some companies have tried setting up new-technology labs to narrow the selection — and to spot the technology winners for their organizations.

Technology last lane

Fidelity Investments in Boston has a team of first-look evaluators who bring many client/server products — and even a few high-end transaction processing technologies — in-house for evaluation. In Fidelity's fast-paced funds management business, timeliness is everything, and technology can help.

"We want to be aware of everything that's happening, and then we want to make our decisions as to where we should be in terms of technology implementation," says Fidelity Investments'

Chief Information Officer, Albert Aklonis Jr. But the gleam of a new technology is not enough for Fidelity to put it into immediate production. "There's no need for us to be the first one out with a new technology," he adds.

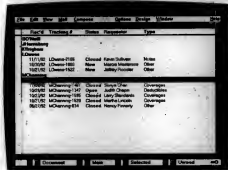
(Cicorp also tracks new technology and pilot-tests promising new products in-house. "We have an extensive web of contacts at universities and other companies to find out which [new technologies] are working and which ones are interesting," says Colin Crook, senior technology officer at the bank. "Those deemed to be valuable are tested thoroughly in-house before deployment" to the bank's operations in 96 countries.)

In short, experienced IS managers say don't let new technology overwhelm you. Technology is not an end in itself, and those who think otherwise are destined to fail.

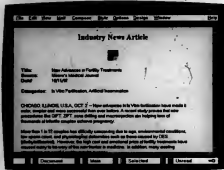
"Probably the place to start is to try to get people to reach consensus on products, one product at a time," Hill says.



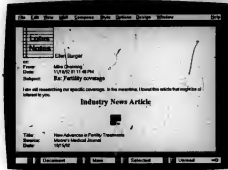
1. This is Mike's Notes desktop. Each icon represents a different database. In the course of the day, these are the ones he uses most frequently. To start the day, Mike decides to check if any new benefits questions have been forwarded his way. He double-clicks on the HR INQUIRY TRACKING icon.



2. Well, there's one that hasn't been read. Ellen Burger has a question about her coverage. Ellen called the company's BENEFITS HOTLINE. The operator entered her query into Notes and it was automatically routed to Mike. Mike double-clicks to find out what the problem is.



5. He simply double-clicks INDUSTRY NEWS, and searches two categories: in vitro fertilization and artificial insemination. First up is a recent story from Moore's Medical Journal. Since the article includes authoritative information, he decides to forward it to Ellen.



6. Mike quickly composes a note and forwards the document directly to Ellen. That done, he gets himself a cup of coffee.

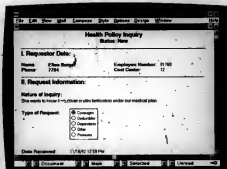
To demonstrate that had to make an

According to critics, including our competition, Lotus Notes® is one of the most exciting software products you can buy. We'd like to show you why.

More than an application development environment and much more than e-mail, Notes enables users to share knowledge anytime, anywhere. With it, you can build a new class of networked applications, without special programming skills.

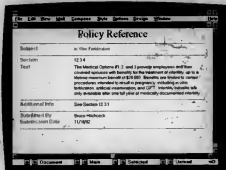
Let's watch how Mike Chanving uses it: As a tracking tool for customer service. As a conferencing system for collaborative problem solving. And as a library for policies, documentation or news.

Mike Chanving
Benefits Liaison



3. Up comes the inquiry screen. Ellen wants to know if the company covers *in vitro* fertilization. Mike, being new, is stumped. He calls his supervisor on the phone for the answer. He's not in yet. Instead of waiting, Mike decides to post the question on the GROUP DISCUSSION database, thinking that someone else might know the answer and respond more quickly.

4. He double-clicks the GROUP DISCUSSION icon. Once in GROUP DISCUSSION, he poses the question to his workgroup. Easy to help. Mike then decides to check out the AHA/STAY NEWS database for any background information that might be useful to Ellen.



7. When he gets back to his desk, Mike checks back into the GROUP DISCUSSION database for responses. Not only has Barry Legler responded with the answer, Barry actually leads Mike to the relevant section of the corporate policy manual by creating a direct link to the document.

8. Mike clicks the DOC LINK icon. Up comes the relevant section of the policy. Mike jots a quick message and throws it back to Ellen. Job done, in less than 10 minutes, by mostly tapping into expertise both inside and outside the company.

e power of Notes, we example of Mike.

Watch how Notes organizes information so it's easy for Mike to get the answers he needs. How effortlessly he taps his workgroup's knowledge. How quickly he accesses conventional references. Now you can see why people who have Notes build their work around it. And why the companies that have installed Notes have seen as much as a 400% return on their investment.*

Now, consider that any business can afford it: A Notes Group Pack™ will have ten people working together for under \$5000. It includes 10 of our most popular Notes applications including SALES MANAGEMENT, CALL DISPATCH and

GROUP DISCUSSION, as well as complete installation and usage documents. For information call 1-800-828-7066, ext. 7325, or your local Notes VAR.

Lotus Notes

Changing Enterprise

Laggards no longer

Client/server is here to speed up those day-to-day processes

By Kim S. Nash

Speed isn't the first thing that comes to mind when you think of accounting, human resources and other financial operations. But that's bound to change.

Financial departments will at last start to consider a full or partial move to client/server this year in an attempt to speed up day-to-day processes and make financial data more accessible.

The need for speed is pushing these departments into client/server waters, but they are also being pulled by the many newly architected packages being developed (see box.)

In the pipeline are client/server applications, where part of the processing is done on a PC or workstation and part occurs on a host. Because accounting, payroll, personnel and applications of that ilk are more generic than, say, manufacturing systems, they're an easier target for software makers to redevelop for a distributed computing model.

The move isn't as easy, though, for users. In a survey conducted by Doo & Bradstreet Software, which polled over 350 attendees at its annual user group meeting in mid-1992, half of the

information systems managers said adopting the architecture would be "extremely difficult," up from 37% the last year. The main trouble spots that have emerged include networking issues and restraining end users.

Tight finances have prohibited pilot projects at some companies. Resources are better spent by applying the new technology to small chunks of larger, real applications.

The credit department at Armstrong World Industries, Inc., for example, is taking tentative steps into networked setups anchored with file servers. The Lancaster, Pa.-based paint supplier said some financial applications off an IBM 3090 mainframe during the past year onto a local-area network of Apple Computer, Inc. Macintoshes, some of which are clients, other servers.

That's a similar setup as far as Phil Cooper is concerned. As a senior credit analyst at Armstrong, Cooper betwines credit lines to customers. Figuring out these credit lines is a "major investment for us that we can do with greater efficiency," Cooper says.

He explains that he now has more information at his fingertips while he's on the phone with a

customer and can make faster but more informed decisions about finance. Paper powerhouse Weyerhaeuser Co. is getting its feet wet with several small client/server projects in its financial departments, according to Tom Jones, a software manager at the Tacoma, Wash.-based company.

An IBM mainframe remains central because of the horsepower it provides, Jones says, but more of the data housed there is now available to finance users.

PC-based query and report packages will also prove a boon to financial departments. Rather than going to full client/server, users can drag chunks of data down from the mainframe and manipulate and write queries to it.

Say a customer orders more paper goods than his current credit account allows. Instead of holding the order for a few days while his credit history is checked and a decision is made about approving his order, nontechnical types can produce a report showing historical data and a summary that explains the numbers via a PC-based credit management package, such as one from SR Research, a start-up company in Cambridge, Mass.



FINANCIAL

MOVERS & SHAKERS

Among the vendors to watch on 1993's client/server financial scene are PeopleSoft, Inc. and Integral Systems, Inc. In Walnut Creek, Calif.; The Bridge Group in Cambridge, Mass.; Oracle Corp. in Redwood City, Calif.; and Dun & Bradstreet Software in Framingham, Mass.

More power please

Flighting chips

Companies can look for the following products next year:

• **WESTERN DIGITAL CORP.** will release more of its Alpha AXP print server running on DEC's Open VMS and Microsoft Corp.'s Windows NT — also slated to ship next year — and on the Open Software Foundation's OS/2 operating system, plus software to go along with the boxes.

• **WISCONSIN COMMERCE DIVISION OF SILECON GRAPHICS, INC.** will release the 75 higher performance R4400 commercial computing chips (the VRX chip, an 8000-ino-cost PC) will be built and available; and T4E, which offers multiprocessor capabilities for scientific, high-end computing.

• **INTEL CORP.** will increase the capabilities of the company's reduced instruction set computing chip with a 64-bit bus structure, enhanced virtual addressing, enhanced floating-point data path and use of denser memory chips in preparation for taking advantage of 64-bit addressing in 1993.

• **IBM MICROSYSTEMS, INC.** in the wake of SPARC International, released specifications for the company's 64-bit architecture, for which Sun and others will release pilot forms in 1993, officials say.

By Melinda Carol Ballou

At engineering sites, as at comparable business organizations, the primary goal this year is to get products to market more quickly and efficiently.

As a result, all eyes are on emerging 64-bit architectures, less expensive workstations with more computing power and software tools, such as computer-aided design and manufacturing (CAD/CAM), that make use of these increased resources.

"Putting more compute power in the hands of more [engineering] users is going to stimulate the migration of sophisticated applications to broader audiences who couldn't afford them before," says Ted Krum, a senior analyst at DH Brown & Associates, a consulting firm in Port Chester, N.Y.

One of those previously unaffordable applications is "concurrent engineering," where engineers perform various parts of the design

cycle in tandem rather than sequentially.

Thanks to 64-bit addressing, superparallel and superparallel architectures and multiprocessing technologies and systems, more people can make use of that technique.

The 64-bit systems will mature in the next few years in terms of compute and I/O throughput, operating systems functionality and memory bandwidth.

As they do — and as applications evolve that make use of the new systems — users sites will have access to sophisticated simulation models that were previously unavailable or required the use of prohibitively expensive platforms such as supercomputers.

The Mayo Foundation in Rochester, Minn., for instance, will use Digital Equipment Corp.'s 64-bit Alpha systems this year to enable faster electromagnetic simulations for chip development, according to Brian Shamblin, computer systems manager.

The Mayo Foundation, parent or-

ganization for the Mayo Clinic, makes chips for use in high-speed data acquisition.

In the CAD arena, tools running on the new 64-bit workstations will speed product development by allowing users to perform more iterations of a design before committing to a physical prototype, says John Donovan, senior analyst at WorkGroup Technologies, Inc., a market research firm based in Hampton, N.H.

The following advances are expected to result from the increase in computing resources:

- High-performance, three-speed graphics at lower price points.
- Higher bandwidth networking.
- Interactive videorecording for design sessions.
- Tools that create prototypes from designs.

To ease application development for massively parallel computers, a number of vendors are working to standardize High Performance Fortran by early this year. This standard is likely to become more broadly used.



ENGINEERING

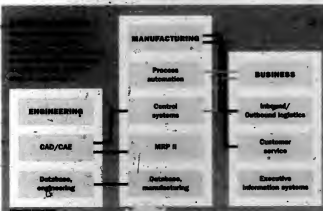
Changing Enterprise

Talk to your PLANTS

By Lory Zottola Dix and Jodie Naze

Manufacturing can no longer operate in isolation.

The most pressing concern for manufacturers in the '90s will be integrating their operations with other areas of the business, according to a survey of 134 IS managers by The Yankee Group.



Standard watch

One initiative everybody is keeping an eye on is CALS, a Department of Defense project that aims to standardize data by 1995 so it can be electronically shared among partners. Key to CALS success is PDES/STEP, a standard for representing product data in digital form, which enables it to be moved among computers. A PDES/STEP draft standard is expected in February.

Integration of CAD with control systems

Enabling technologies Computer-aided design (CAD), networks, specialized "sliding software" and 386-based PCs.

Insight In the next five years, key strides will be made in rapid prototyping - the ability to go from a CAD design to manufactured part in hours or days. In one technique, CAD data is sent to a machine that breaks the information down into a series of cross sections. The machine feeds the cross-section data into a computer-controlled

laser beam, which scans the surface of a vat of photo-sensitive liquid that hardens as light hits it. The final result is a finished part, prototype or mold.

Outlook The plan is to expand the process beyond only producing small parts or molds and to improve durability. No one is mass-producing huge products this way today.

Integrating the shop floor and back-office operations

Insight At Texas Instruments, Inc. in Dallas, factory floor and back-

office processes are coming together. When a worker logs on to a system in the shop, information on where he is working and for how long is gathered into a labor collection system. The system then generates payroll.

"We don't have time cards or time clocks," says Rusty Patterson, advanced technology operations manager. The system prints off a certain amount of time spent by without any user input. "It logs them into a nonrecoverable section of my overhead, so we're not charging [customers] for something we're not working on."

Integrating manufacturing with engineering

Enabling technologies Product information management systems (PIMS).

Insight PIMS will increasingly enable engineering and manufacturing information to be managed as a single cycle, allowing the engineering data to fall much more rapidly into the manufacturing process.

This in turn will permit new products to be created and sold much faster. If your company notices a particular trend in the marketplace, you can change the design quickly.

PIMS also limit quality problems. For instance, a manufacturing person can peer over an engineer's shoulder (via the system) to see what a design looks like. If he sees a potential problem, he can suggest a design change.

In the past, companies had to build these systems on their own. With the advent of the off-the-shelf turnkey PIMS, companies do not have to pay up to \$20,000 per engineer to build such a system. Costs have dropped to about \$2,000 per engineer.

Outlook PIMS will continue to gather momentum in the next few years, with sales growing roughly 23% per year.

Source: Kate Mearns, manager, computer quality services, Westinghouse Productivity and Quality Center, Pittsburgh; Bradford Schen, chairman, ISO standards committee, Culverburg, Ill.; Martin Puzoski, director, and Harry Lee, analyst, The McGraw-Hill Manufacturing Automation Planning Service, Boston; Roger H. Naze, deputy director, The Institute, Bethlehem, Pa.

Integrating manufacturing with customer service/sales

Enabling technologies Client/server technology; electronic data interchange (EDI); voice recognition.

Insight Want to shrink your order processing time to half? You could if your system took electronic orders and used them to trigger the manufacturing process automatically. Using this method, Taudent Computers, Inc. has shrunk its turnaround time - receiving an order to shipping the product - from 17 days to two.

Client/server is one key. It enables orders to be entered into the pipeline much faster than a batch process. EDI gets orders transmitted almost instantly to suppliers, avoiding errors made from retyping information.

Outlook Most manufacturers will head in this direction during the next few years.

Integrating control systems with business areas

Enabling technologies Manufacturing execution systems (MES).

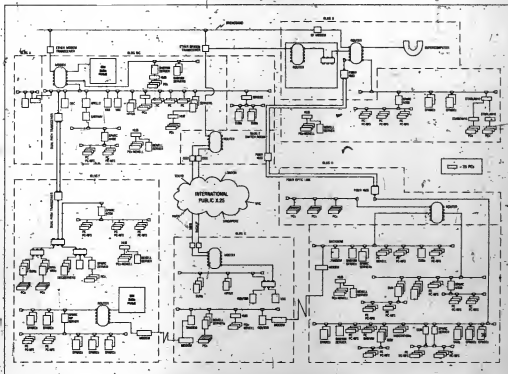
Insight MES will increasingly be used to transform business plans automatically into details, schedules, assignments and material and labor requirements. It also provides a real-time reflection of what's happening on the factory floor.

Companies can also analyze MES-generated historical data to continuously improve the production process.

For the semiconductor arena, historical data analysis has become absolutely essential because yield rates (the number of good vs. bad parts made) can make or break a company. If a rival company makes 80% good parts and you only make 58%, you can go out of business.

Outlook The growth rate for MES will be 15% to 20% through 1993.

Reality.



(We should talk.)

The confusing jumble of resources you think you have, is, unfortunately, the confusing jumble of resources you actually have.

And while nobody can truthfully say it's easy connecting your PCs to these resources, there is a solution.

It's a robust, TCP/IP-based, PC networking software product called PC-NFS®

PC-NFS software allows you to connect not just a few PCs, but hundreds, or even thousands of PCs. To over 90 major platforms, including UNIX® workstations, VMS® and IBM® mainframes. With no gateways, bridges or routers. It supports key standards for multivendor network computing such as Sun's Open Networking Computing/Network File System (ONC®/NFS®) and TCP/IP. Giving you the most open and scalable network operating system for PCs on the market.

Today, more than one million people in major companies around the world are using PC-NFS to access corporate-wide applications, servers, printers, files, and storage devices—all without sacrificing their familiar MS-DOS® and Microsoft® Windows® environments.

So, if you are hearing a distorted view of reality from other vendors, give SunSelect a call at 1-800-24-SELECT. You'll change your perception of PC-to-enterprise networking forever.

 **SunSelect**
A Sun Microsystems, Inc. Business

Changing Enterprise

What happens when 'close enough' isn't close enough anymore?

By James Daly

Associated Grocers, Inc. in Seattle, bunches don't go as far as they need it. In fact, they don't go very far at all.

Paced with the task of stocking 350 grocery stores in Washington, Oregon, Alaska and Hawaii each day, the folks at Associated Grocers used to team up with suppliers to make educated guesses about how much soap powder would sell that week or whether

to stock up on Blag cherries. Daily sales figures could take days to arrive at corporate headquarters.

No longer. Today, a machine at the checkout counter records the quantity of each product sold and delivers that data to product warehouses each day. For instance, a soap that sells out on a chilly Thursday evening will be completely replenished on Friday morning.

"Just-in-time inventory is no longer something we dream about but [something] which we employ every day," says Richard Lester, vice president of information systems.

What has changed is the company's increasing use of electronic data interchange, which allows it to write, authenticate and deliver electronic purchase orders. It's a move that has "fundamentally changed the nature of our business," Lester says.

As at many companies, technology at Associated Grocers is completely changing the way the company delivers its product or service. More and more, IS managers are being asked to help out in the critical

area of distribution.

At McKesson Drug Co. in San Francisco, a new technology has all but eliminated what was once an annoying and costly thorn in the side of the \$10 billion pharmaceutical distributor: mispicks. At any complex distribution center, the chore of tracking millions of individual items as they shuffle from forklift to tote box is extremely complicated and vulnerable to human error.

Douglas Thompson, senior vice president of distribution services, estimates that each warehouse mispick was costing the company about \$80 in lost time and shipping costs — seven times more than the cost of filling an order correctly the first time.

Accuracy in a glove

McKesson warehouse workers are now using in-house-built "wearable PCs" to track deliveries, increase the accuracy of customer shipments and generally improve service.

Weighing less than 13 ounces, the AcuMax fits over the worker's hand and forearm like a glove. When the employee picks up an order form, he activates a scanner in the glove by pointing an index finger at the customer's bar-coded shipping label. The scanner then tells the picker the exact location of the item to be picked. The picker goes to the case lot and confirms the order

by using laser beams from the AcuMax to read data on bar codes up to 20 feet above the warehouse floor.

No more mispicks,
no more guesses-
timates.
That's the goal of new distribution systems.

Before AcuMax, McKesson tried to rely on pistol-shaped bar-code readers. But because these portable scanners require two hands to operate, they never really caught on in a warehouse where workers need both hands to do their job.

While the moves of both Associated Grocers and McKesson have brought new speed and accuracy to product delivery, IS warns of pitfalls that are often associated with such a technical evolution. The most important of these is miscalculating the real development and operations costs of the products in the channel.

Short-term costs, such as the price of all the technologies and training needed to start the program, as well as long-term factors, such as upgrading the equipment or

general upkeep, may be overlooked or underestimated.

Prepare for tomorrow

Also, beware that the technology you're using to ease distribution doesn't become obsolete. If you are unwilling to keep the products modernized over the years at some suitable cost, alternative technologies should be available.

In addition, psychological considerations should not be overlooked. You will need to spend a lot of time marketing the new way of doing things as well as adjusting internal perspectives before staff members feel they can rely on and accept the new technology.

"IS needs to evaluate all those concerns," says Rick Marolt, IS manager at Great Central Insurance Co. in Florida, FL. "We can't simply force our own way at every opportunity."

Key techs

Increased use of alternate-input technologies. These include the AcuMax scanner/glove (see story at left), pen-based PCs, bar-coding and voice-recognition machines.

Wireless technologies will arrive in an early form, heralding greater things to come mid-decade. These will be used to transmit data quickly without costly and complicated wiring setups.

Electronic data interchange.

Use of multimedia to provide instantaneous on-site training for new technologies.

Expanding use of CD-ROM to collect and distribute far more information to shoppers in a more timely fashion.



DISTRIBUTION

More users! This time, it's your CEO

As executives learn of time savings, big cheese use of computers is rising

By Joseph Maglitta

Top bosses often talk a good game about the importance of using technology to make their businesses more competitive. But when it comes to practicing what they preach, many have traditionally been — to put it bluntly — techno-averse.

But wait: There are signs that top corporate chiefs in marketing, sales, administration and other non-technical areas are showing more interest in using technology to improve their own productivity.

A recent *Computerworld*/Anderson Consulting survey of top executives in 200 large U.S. corporations showed that executive use of desktop technology is rising. The percentage of chief executive, operating and financial officers who said they use a PC or terminal in their daily work rose to about 56%. Many expressed interest in knowledge-based and executive information systems (EIS).

What's really nice about the increased interest is that executive fervor can help spread technology in the ranks across an entire com-

pany. That's what happened at Bay State Gas in Weymouth, Mass., where high-level enthusiasm helped expand a PC-based EIS into general use, says John Doucette, vice president of administration at the 270,000-customer utility. "It's the first thing [top executives] turn on in the morning," Doucette says.

Company officers using Pilot Executive Software's Lightweight product installed in January have point-and-click access to group calendars, shipping and financial information and more, according to Doucette.

Topping many executives' priorities is managing the flow of outside information. Personal productivity, many bosses say, can suffer badly from information overload. Some are turning to a variety of software-based "information screens," or filters, to manage the mountain of data they need to do their jobs.

Among the enthusiastic users of these products and on-line services is a corporate licensing director at Merck & Co. in Rahway, N.J.

"I tell [the sergeants] what my thinking is so that I'm not weeding through 200 gazillion press releases," says the director, who uses a product from Individual, Inc. in Cambridge, Mass.



CORPORATE

If you're looking
for a computer
that will grow
with your needs,
there are basically
only two ways
you can go.

The hard way.



Add Windows, buy a new PC. Most PCs in use today weren't designed for graphical computing, so if you want to run Windows, you may have to buy a new computer. Why not consider a Macintosh and avoid all the problems on the page forever?

Buy a new, reconfigure your system. If your system doesn't come with a mouse, you'll need one. But first be prepared to install and configure a special software driver. Or use with a Mac - you just plug it in.



Call for help. There is always a way to get a complicated PC - there's someone else to do it for you. Or we know, of course, that can wind up costing you more than the PC.



Add peripherals, reconfigure your system for each one. Want to add a CD-ROM or hard-disk drive? Then you're in a world of hurt installing cards, flipping switches and setting files - for each one. With a Mac, you can add up to seven peripherals by simply plugging them in and clicking a button or two.

Add printers, adjust DIP switches. Installing a printer seems easy. Until you set your DIP switches, install your driver, locate your Windows cluster, make an error and lost all your pages.



Add networking card, reconfigure your system. Is there file and word a mail to other PCs you give this to add a card? The mouse going through the ring, without process of reconfiguring your system. On a Mac, you just plug in a cable.

Upgrade your memory, reconfigure your system. Add memory to a Mac, and it reconfigures itself automatically. But add memory to a PC, and you'll almost always have to run a setup program to configure the new memory - or the computer won't know what to do with it.



Add almost nothing, reconfigure your system. Expanding your PC's capabilities can be amazingly frustrating. But a Macintosh easily adjusts to whatever extra device you add to it.

Change monitors, reconfigure your system. Add a new monitor and you'll have to reconfigure your entire system - or your monitor could find the Mac one. A Mac recognizes a new monitor and adjusts to it automatically.



Whoo! When you add something to an ordinary PC, you may have to reconfigure your system - a process of hours and software adjustments, which can be complex, tedious, and take up hours of your time.



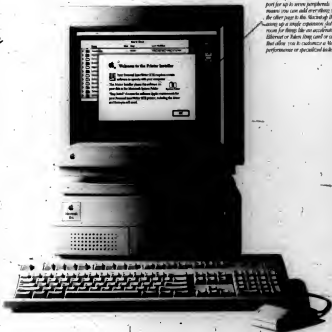
Manual labor. Software the Windows partners to make things easier. But the reality is, you'll still spend hours reading manuals just to make it all work - time you could spend doing more useful things with your computer.



Expand your PC, take two aspirin. Possibly you'll want to expand your computer's capabilities by adding extra drives. The more instructions you dig through and articles you fiddle with, the more time it will take. And the more pain relief you'll need.

On a typical PC, even adding a single hard disk can be extraordinarily complicated. You'll probably have to "reconfigure" your system - the time-consuming process of telling your computer what pieces you've added. You may have to edit complex CONFIG.SYS and SYSTEM.INI files, install special device drivers and fiddle with DIP switches. And, of course, building even a basic network is extremely difficult - what with installing

The easy way.



Macintosh was designed to make it easy to grow. Networking and shared support are already built in. File sharing and multi-media capabilities are standard. So a support for up to seven peripherals. Which means you can add everything you see on the other side of the Macintosh. It's effortless. Setting up a single expansion slot. Leaving room for things like an accelerator card, an Ethernet or Token Ring card, or other cards that allow you to customize a Mac for high performance or specialized tasks.

cards and networking software. An Apple Macintosh, on the other hand, knows when you've added a hard drive. Installing a CD-ROM drive or scanner is a matter of plugging in a cable and clicking a couple of buttons. Even installing a network requires nothing more than plugging one Mac into another. It's just one more example of how a Macintosh works in a simple, logical way. So you can, too.



Changing Enterprise

Winning paper chase

By Michael Sullivan-Trainor and Lory Zottola Dix

How IS will be getting, prioritizing and allocating money next year



Budget request time

Lengthy approval

HOW LONG DID IT TAKE TO OBTAIN APPROVAL FOR YOUR 1993 BUDGET?

Percent of respondents*

Less than a week	11%
1 to 3 weeks	14%
3 weeks to 1 month	13%
1 to 2 months	19%
2 to 3 months	22%
3 to 6 months	12%
More than 6 months	5%
Other/don't know	5%

*Numbers have been rounded

Bigger budgets

HOW DO YOU EXPECT YOUR IS BUDGET TO CHANGE IN 1993?



If INCREASES, BY HOW MUCH?

1% to 5%	72%
11% to 30%	21%
31% to 100%	7%

If DECREASES, BY HOW MUCH?

1% to 10%	10%
11% to 30%	29%
31% to 100%	17%

Response base: 7,005 IS professionals

Source: CW Quarterly Review



Creating a shopping list

Networks and WANs

WHAT IS YOUR HIGHEST INVESTMENT PRIORITY?

LANs and WANs	24%
Client/server	18%
DBS and OSS	13%
EDI	12%
Image processing	7%
CAD	5%
Fiber optics	5%
Other	8%

Staff biggest expense

WHERE IS THE MONEY SPENT?

Staff	36%
Hardware	15%
Software	12%
Maintenance	9%
New applications	8%
Personal computers	7%
Data communications	6%
Capital investment	4%
Training	3%
Service contractors	2%

FOR EVERY \$1 DOLLAR SPENT, HOW MUCH IS SPENT BY USER DEPARTMENTS?

Less than 50c	25%
51c to 10c	12%
10c to 20c	15%
20c to 30c	17%
30c to 50c	17%
\$1 to \$4.50	5%
\$4.51 to \$5	1%
More than \$5	5%
Other/don't know	13%



Figuring the cost

Requests mostly granted

HOW WAS THE AMOUNT GRANTED DIFFERENT FROM WHAT YOU REQUESTED?



If LESS, HOW MUCH LESS?

1% to 5%	39%
6% to 10%	33%
11% to 30%	19%
More than 30%	12%
Other	6%

If MORE, HOW MUCH MORE?

Less than 1%	20%
1% to 5%	80%

Less staff, more hardware

HOW WILL THE IS STAFF CHANGE IN 1993?



HOW WILL THE INSTALLED VALUE OF INFORMATION SYSTEMS CHANGE IN 1993?



Meeting with management



Trimming the fat



Funding the projects



Rainy day savings

Illustrations: Robert Zimmerman

Source: Exclusive CW Forecast Survey; response base: 302

The survey also found that the bulk of the IS investment will go to customer service and manufacturing functions, with finance/administration and sales/marketing a close second. The third spending priority will be distribution.

There's one little word that can strike terror into the hearts and minds of Information Services professionals everywhere: downtime. But thanks to the new Symmetrix 5500 from EMC, it's one word you can

And because it's based on EMC's proprietary Integrated Cached Disk Arrays (ICDA™) technology, there's simply no faster way to access data on an IBM or compatible mainframe computer. The

If your data is mission critical, it's critical you read this ad.

virtually banish from your vocabulary.

You see, the Symmetrix 5500 ICDA™ is designed with redundant hardware components, proactive maintenance features, a full mirroring option and the ability to repair or upgrade the system with no loss of uptime. In short, Symmetrix



The Symmetrix 5500 is part of an entire line of disk storage systems based on EMC's Integrated Cached Disk Arrays (ICDA™).

mission critical sites that need access to data 24 hours a day, seven days a week.



Symmetrix 5500 also brings all the features of the Symmetrix Series to mission critical environments: a small footprint, low power and cooling requirements and a two year warranty that add up to reduced cost of ownership and a maximum return on your storage investment.

Downtime can cost your business over \$100,000 a day. So, if your data is mission critical, make it your mission to learn more by calling 1-800-424-EMC2, ext. LM67C.

EMC²
THE STORAGE ARCHITECTS

Forecast: Changing Industry

For the industry, it's time to pare down, bulk up, get sophisticated, get a little crazy — anything to survive.



Staying alive

The 'little guys' try to grow up

By Carol Hildebrand

Look out, information systems managers: PC software vendors are gunning for you. No longer are they simply tempting microcomputer managers with the latest in software features; now they're coming after corporate decision makers with a much more sophisticated bag of tricks, consisting of an expanding variety of services.

All the new approaches — different distribution channels, fledgling consulting services, software bundling — are aimed at finding new ways to sell directly to a tougher and more skeptical user target: IS decision makers.

Consider the following:

- **Microsoft Corp.** has unveiled 24-hour, seven-day-a-week support programs, along with the "Open Process," under which third-party developers and user companies are invited to preview and comment on Microsoft works in progress.

- The company also launched a major service and support initiative, dedicating \$100 million to help revamp its image as a company cold on service.

- That kitty also includes an expansion of its consulting arm. Microsoft has also tweaked pricing for single and bundled applications.

- **Borland International, Inc.** has extended technical support lines and added the "EASE" program, which encompasses pre-release

evaluation, volume purchasing, maintenance and technical support.

- An Integrator Partners Program targets integrators such as Arthur Andersen & Co. Borland has been a leader in innovative pricing schemes.

- **Novell, Inc.** has a Consulting Services unit that works with resellers to customize NetWare. A Key Accounts program sets up large NetWare sites with an account manager and provides a direct channel to Novell for support and planning needs.

- **Lotus Development Corp.**'s consulting business preceded Microsoft's, and it works with accounts implementing complex products.

Little guys, page 42

UP and COMERS

Affiliated Computer Systems, Inc.
Dulles

You may know of this outsource because of the publicity surrounding its claim that IBM's outsourcing practice violated antitrust laws. That went nowhere, but this 4-year-old firm is now a \$179 million company and has caught onto innovative financing — such as making equity investments in its clients through its fledgling subsidiary, ACS Capital. Expect more noise this year, including bigger accounts.

CompuLink Computer Corp.
Pittsburgh
Houston

Shapiro doubted that anyone could
Continued on page 42

Changing Industry

The 'little guys' try to grow up

CONTINUED FROM PAGE 41

such as groupware. It has also eased up on licensing policies and is pushing SmartSuite, its integrated application set.

IBM spun off its entire PC division in a seemingly successful bid to react more quickly to pricing and product demands. This move is playing the curiosity of some accounts that stayed.

Analysts say IBM's move from dictator to accommodating partner stems from efforts by many desktop software and hardware suppliers to work directly with its management. Vendors clearly are willing to make concessions, often on price, to get the business.

For example, in early 1992, Lotus announced a huge deal with Arthur Andersen and its affiliate Andersen Consulting to acquire 20,000 copies of Notes.

Flexibility on licensing was key to the deal, says Charles Paulk, Andersen Consulting's chief information officer. He adds, "On the licensing issue, they are all struggling with how to [accommodate] large firms."

In the works

Expect more deals like the Andersen one in the PC software industry. "Users are looking to deploy enterprise-wide solutions, and that is IS' business," says Will Finkle, an analyst at AMR, Brown & Sons, Inc. in Baltimore. Ronan McGrath, vice president of IS and accounting at Canadian National Railways, agrees that many IS departments are seeking "mainframe-type relationships" with their PC vendors in order to obtain direct access to a point person who can address their problems.

McGrath adds that "any company

that thinks it will continue [solely] on the retail level isn't familiar with the amount of restructuring that's going on."

Chasing corporate dollars

Many desktop vendors began moving IS-level corporate buyers as their software took on higher visibility in corporate IS shops.

Take Novell, already the dominant player in the local-area network market, with a market share of more than 60%, analysts say.

But most of that lies in small companies, workgroups or departments. So Novell is pushing to establish NetWare as a compelling platform of choice within the Fortune 1,000.

For example, in early 1993, Novell plans to release NetWare 4.0, a re-architected version of its NetWare operating system designed for the high-end, corporate LAN site.

NetWare 4.0 will include many—but not all—features high on the list of IS buyers, including a 1,000-user version, a distributed, X.500-based directory service, the ability to run applications in protected memory, support for mirrored servers and protection against hardware failures.

"Novell is now providing the products that corporate NetWare users really need, and they're coming at a moment too soon," says Marc Dodge, telecommunications department manager at United Parcel Service, Inc. in Mahwah, N.J.

Users like what they're seeing, but there's always one more step. "What we'd like to see is the major [PC] vendors expand the resources needed to understand the businesses that we're in," says Craig Goldman, CIO at The Chase Manhattan Bank NA in New York.

Staff members Rosemary Cifano, Christopher Lindquist and Michele Doucet contributed to this report.

Service and support—that's where the money is

By Thomas Hoffman

Heavyweights of the industry that once prospered from high-end hardware sales have been forced to refocus on service and support as their customers resign purchasing plans with a more desktop-oriented view of the enterprise.

Traditional hardware vendors, such as IBM, Digital Equipment Corp. and Unisys Corp., found out the hard way that dollars once reserved for big iron are now earmarked for downsizing and re-engineering projects.

All three companies have already shored out a piece of the services market and are betting heavily that these revenues will grow. Analysts say the services sector is increasing at a 12% annual clip.

Plans to expand services next year won't be enough. Industry experts say. Users are looking for vendors they can partner with, particularly in the area of multivendor integration. "We want our vendors to form alliances to make their products work better together," says Dennis Henley, vice president of MIS at Toys R Us, Inc. in Paramus, N.J.

IBM is trying to meet these requirements. In October, it announced the IBM Consulting Group. Robert M. Howe, who heads the unit for IBM, says it will remain objective in providing the best hardware and software to fit customer needs—even when the item in question doesn't have an IBM logo on it. "You can't be a player in [client/server] today and insist that it has to be IBM," he says.

Looking to next year, Howe says all service firms will have to focus on consultation and services directed at transforming or re-engineering business processes aimed at improving customers' profitability and services to their own clients.

Users will be more focused on reducing operational costs and less concerned with cutting information systems expenditures, according to Jeff Schwartz, an analyst at Taskquest/Lodgeway Group, a Framingham, Mass., services research firm.

By using a mix of technology and services to re-engineer business

As customers funnel dollars toward downsizing projects, big-iron vendors will turn to consulting.

processes, Schwartz says users will be looking to enhance their companies' revenue potential.

Better than before

Jeffrey Kaplan, another Taskquest/Lodgeway analyst, says the largest service firm—namely, Electronic Data Systems Corp., Andersen Consulting, IBM, DEC, and Hewlett-Packard Co.—have been increasing their desktop and network support.

Kaplan says IBM, through its Integrated Systems Solutions Corp. (ISSC) outsourcing unit, is offering customers "considerably more downsizing services than it once did."

Dennis Welsh, ISSC's president, says Advantage, the joint venture between IBM and Sears, Roebuck and Co., will provide broader voice and data networking capabilities by expanding the scope of technologies such as electronic data interchange. IBM also introduced an Open Systems Center in Dallas.

The facility houses a wide variety of multivendor systems and was developed to enable users to come in and troubleshoot integration problems between different platforms.

DEC plans to offer users "teams" of re-engineering and downsizing specialists in 1993, according to Nick Sharma, DEC service marketing and planning manager.

The company will focus on four major service areas in 1993: multi-

vendor services, outsourcing, systems integration and downsizing, along with multivendor interoperability.

HP has expanded help desk services to support customers' multivendor products on any competitive platform.

Unisys, meanwhile, has combined professional services and maintenance support under one umbrella.

The program can bill customers for services on a monthly basis instead of a large one-time annual fee, which may remove a barrier for prospective customers who are wary about paying large up-front service fees.

IBM
Has lost \$5.76 billion in its third quarter ended Sept. 29, but services for that period grew 3% to \$2.8 billion.

UP and COMERS

go head-to-head with Hewlett-Packard Co. on printers. But Compaq carefully aimed its first two products at its traditional stronghold (mainframe), targeted HP's 35% on a few printer capabilities, and beat it on price as well. The addition of a printers into Compaq's

product line could make the idea of one-stop shopping more alluring, analysts predict.

Cooperation Solutions, Inc.
San Jose, Calif.

This venture capital-funded firm—founded by former Tandem Computers, Inc. software executives and one of the largest software

ventures ever at \$30 million to date—has a highly regarded client/server application development tool set named Ellipse. The product, which works like a fourth-generation language that generates code, bridges the gap between Windows, OS/2 and Unix. It also supports graphical user interfaces and data-sharing among programmers and is rumored to

Changing Industry

Small-company spirit

As revenue continues to dip, the big guys try to change their image as 'just order-takers'

By Johanna Ambrosio
and Melinda-Carol Ballou

If the large system vendors want to do anything beyond just barely scraping by this year, they will have to heed customer demands for more open, more modular and less expensive big iron.

"Cost and price are what's driving us," says Marvin Ehlert, vice president of MIS at National Gas Pipeline Co. in Lombard, Ill. "Any way our cost of doing business can come down is what we're looking for."

Even more than last year, 1993 will be a test of how well the mainframe and minicomputer vendors can adapt to customers' changing requirements.

IBM, for example, faces a tough fight as it brings to market its top-of-the-line eight-way mainframe, technology that some of the plug-compatible vendors,

including Amdata Corp., are already shipping for less money.

"Some users have already said they will look more to the plug-compatible manufacturer this year because of their lower prices."

It's also a sad bit that more client/server systems will be implemented at customer shops, forcing big-systems suppliers to pull out all the stops to compete with these smaller fry and convince customers that, yes, they still need the large machines.

Economic considerations

Although the mainframe market will grow this year (albeit in the single-digit range), the economy looms large as a big "maybe" factor. At the very least, large systems vendors will likely report another year's worth of pain to middling results and may even have to go through another round of cutbacks similar to last year's.

Another big "maybe" factor is the customer. Many are grappling with how best to tap technology to serve their businesses. "Someone put a head grenade on the table, and we ran it," says John Stevenson, vice president of MIS at De Pepper Seven Up Co. in Dallas.

"There used to be a white stripe down the highway, and you knew if you stayed within the lines

you'd be OK. But that's not there anymore, and the profusion of options has challenged us quite a bit," Stevenson said.

"As a result of this confusion, customers 'are not likely' to write checks — 'especially big checks,'" says analyst Bob Durdjovic, president of Amnir Research in Phoenix.

Naturally, the big-iron vendors won't stand idly by. IBM will try to fight back with more open, modular mainframes while pledging to deliver at least

initial versions of MVS in 1993 that adhere to standards such as POSIX and the Open Software Foundation's Distributed Computing Environment.

IBM will also position its mainframe as more of a client/server computer. It is expected to unveil more products that will work within its Systems Complex (C/plex) architecture to link mainframes with one another and with other, smaller machines.

Unisys

Unisys' total service revenue is growing at an 8% annual rate, totaling approximately \$1 billion.

The big boys play

Mearns, Amdata, Unisys Corp., Hewlett-Packard Co. and NCR Corp. are expected to play up their Unix-based mainframes, as well as better price/performance vs. IBM.

Other IBM strategies call for pushing current and new, higher and RISC System/6000 Unix computers further into commercial accounts and aggressively marketing its services companies, including a new consulting company formed last year, IBM Consulting Co., and Integrated Systems Solutions Corp. for outsourcing.

Late last year, however, IBM ran into some political trouble as the U.S. Department of Justice began investigating whether RISC violates the 1986 Contingent Contract that IBM signed (CW, Nov. 9). It is unclear how it will play out and to what extent it may affect the company as a whole.

Already, IBM is garnering kind words from customers for its "we-try-harder attitude." They are actually sending people to ask us questions about architecture, technologies and business requirements," says Terry Lowder, vice presi-

HP

HP's overall '93 revenue was \$6.45 billion. Of that, service revenue was \$2.4 billion.

For its part, Digital Equipment Corp. will have a whole raft of action items to execute in its bid to reverse last year's losses.

After four punishing quarters, Digital Equipment Corp. must continue to slash expenses, raise revenue with new product releases and expand its service offerings — in order to survive as a profitable company this year and beyond.

DEC Chief Executive Officer Robert Palmer pledged to do just that last year, saying the company will cut an additional 20,000 employees over the next two years, streamline matrix management and redundant engineering groups, make more use of cost-effective third-party distributors and focus more on systems integration.

DEC's future also "rests on the success and viability" of its 64-bit Alpha reduced instruction set computing-based machines, says Judith Hurwitz, president of market research firm Hurwitz Consulting in Newton, Mass.

Hurwitz added, "DEC is off the radar screen right now [on the Unix side]," but the technology is strong.

Customers are cautiously optimistic about the restructuring. "I think it takes a great deal of nerve, but my concern is what they're going to do to R&D budgets," says Bill Mayhew, chairman of a special interest group in the Digital Equipment Computer Users Society.

"Research and development has been DEC's strength, and I get a little alarmed seeing them making the cuts, though some of it has to happen," he added.

But it will not be an easy year for DEC — or for any of the major players — as they all chase the ever-elusive large systems dollar and learn the hard way that bigger does not necessarily mean better.

dent of advanced technology at Rane Computer Services Corp. in Columbus, Ohio.

"It used to be just an order-taking role, but now they're eager to hear and not just willing to listen," Lowder said.

Tough at the top

Last year found many industry heavyweights bemoaning "Thinking Up Is Hard to Do" as they scrambled to recognize and redefine their businesses. This year could be some odd year if big system boys don't pick up. As an, expect more layoffs and expense-cutting among the heaviest hit of all the major vendors last year was DEC. Its new CEO is cutting costs,

reorganizing the company and focusing on Alpha AXP and consulting in an attempt to regain profitability. The worst may not yet be over for IBM either. Despite a

major restructuring begun in 1991, for the third quarter ended Sept. 30, IBM reported a \$2.78 billion loss, including a \$4.4 billion charge for the early retirement

program. Some analysts predicted that IBM may have to meet to layoffs if results do not pick up by the first

half of 1993.

Some analysts predicted that IBM may have to meet to layoffs if results do not pick up by the first half of 1993.

have an integration pact in the works with Texas Instruments, Inc.'s HP.

Digital, Inc.
Los Angeles

Although it's been in the object-oriented programming (OOP) development tool arena for nearly a decade (with Methods and Smalltalk), Digital recently took object-oriented

programming a step further with its Parts technology. Parts is one of the first (if not the first) OOP development tools to allow robust applications to be built without

programming. It also allows legacy systems, such as Cobol, to be encapsulated and used to update OOP applications. This is the future of graphical development environments: providing tools on

industry-standard platforms.

HyperDesk Corp.
Westboro, Mass.

The company's HyperDesk Distributed Object Management System (DOMS) helps build applications that let users access data transparently, no matter where it is stored in the distributed environment. This type of

"software backbone" is going to be crucial for developing true client-server applications. The product is also compliant with Object Management Group's Object Request Broker standard.


Intel Corp.
PC Enhancement Division
Hillsboro, Ore.

This trial division is looking at the kinds of system functions — pricing, backup, management — that are currently lacking in the local-area network environment and trying to provide plug-and-play "shrink-wrapped" servers. The goal is to make LAN systems robust and secure enough that people feel comfortable basing their company on them.

Continued on page 48



OS/2



With OS/2 2.0, you won't need one of these.

If you run more than one application at a time with DOS and Windows, brace yourself. When one application fails, the entire system can fail. It's called a crash, but most people call it worse than that. Because each time it happens, you have to reboot your computer. If you didn't save what you were working on, you simply have to do it again. So every crash could be a huge crush. And a huge waste of time.

OS/2 2.0 is different, because OS/2 Crash Protection helps shield applications from each other. In other words, each running application is self-contained, so if one goes down it won't affect the others or the operating system. No frequent systemwide crashes like in Windows. So you won't lose all your valuable work. Not to mention time. And OS/2 can also save you money, because for less than the cost of DOS and Windows, you get the capabilities of both. Plus all the added benefits of OS/2 2.0, including Adobe Type Manager.

OS/2 2.0 lets you work like you never could before. And OS/2 Crash Protection helps keep it all from coming to a crashing halt. For an IBM authorized dealer near you, or to order OS/2 2.0 from IBM—for only \$99 for Windows and DOS users—call 1 800 3-IBM-OS/2.

Presenting OS/2 Crash Protection.

- Runs DOS, Windows and OS/2 applications from a single system.
- OS/2 Crash Protection helps shield applications from each other.
- No need to reboot your computer if an application fails.
- Supported on most IBM-compatible 386 SX PCs and above.
- OS/2 2.0 upgrade: \$99 from Windows and DOS.*



Changing Industry



Vicki Korman

the BIG drop

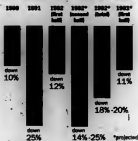
by Derek Slater

Get ready for the ride of your life — keeping track of technology pricing in 1993. In particular, software purchasing will get more complicated — for large and small systems alike. On PC and mainframe hardware, the main action has a downward pitch, at roughly the same slope as last year.

PC hardware

TREND

Research firms expect PC street prices to decline at roughly the same pace as last year.



July 1992

January 1993*

July 1993*

Source: International Data Corp.

PC software

TREND

PC software licensing prices, while getting more complicated, are decreasing overall.

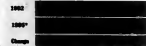
“We’re beginning to see a lot of channel-specific pricing. You pay one price if you buy from a mail-order house, another price if you buy from a retailer. You generally pay a lower price if you buy direct, but a good many corporate customers wind up paying a higher price to get important services such as handling purchase orders from retailers.”

Jeff Varley, editor, “SoftLetter”

Large systems hardware

TREND

The price/performance curve for IBM and compatible mainframes is expected to stay in the 18% to 20% range, allowing users to purchase a system that is between 18% and 20% more powerful for the same price.



Source: Gemini Group, Inc., Dean Miller Reynolds

Expected list price discount '93

40% to 50%

(Includes software, services and actual hard-dollar savings.)

Large systems software

TREND

Mainframe software pricing is likely to undergo the most radical restructuring in the coming year.



Source: Sybase

Computer Associates

- An enterprise licensing option is based on total MIPS of users hardware.
- A new maintenance plan lets users pay a one-time fee to freeze software maintenance costs in a five-year period.
- Users can trade old CA applications for new ones with little extra cost when changing hardware platforms.
- A new option provides savings for users who plan to rapidly upgrade processing capacity or drastically cut back on large systems.

DEC

New policies allow users to move applications between hardware platforms with no additional charges.

- CPU-based licensing for users with very stable operating environments.
- Personal-use licensing that guarantees access for particular users.

IBM

- Pricing option provides a deeper discount for moving multiple operating systems on one machine.
- New pricing structure for two client/server packages that run in part on the mainframe. Price based on number of LANs connected to host.

ANNUAL

for
1993



If You Haven't Got A Cost-Effective System, Change It.



A Subsidiary of
Computer Horizons
Corp.

That marvelous, advanced business applications system your company installed years ago has suddenly become old by today's standards. It can't keep up with your fast-paced business needs, or worse, your competition. And your best people are bluntly unhappy about being so far from the cutting edge.

So what do you do... junk it, and invest a fortune on a new one?

NO!

Call **Horizons Consulting, Inc.**, acknowledged leaders in **Systems Refurbishment**.

Our specialists will assess your

applications and systems, providing a step-by-step statement of changes, adaptations and benefits to allow you to make informed decisions about the changes you desire. Initially, we'll upgrade and/or re-engineer your applications, bringing the output in line with the needs of your business processes. We'll follow this up with intensive system level re-engineering, to assure maintenance of your inter-application data links. And in most cases, we'll deliver performance gains as well.

True Business-Process Re-Engineering. All for the fraction of the cost of a new system.

If You Don't Have The Total Solution, Get It.



When you need a total solution to any hardware, software or "liveware" problem, call **Computer Horizons Corp.**

With 27 state-of-the-system locations coast-to-coast, and a permanent staff of over 1,000 industry professionals, we are a leading provider of integrated information systems solutions to business and industry.

We've taken an approach that focuses on your specific goals, so we are well positioned to offer completely flexible access to leading-edge methodologies, tools and technologies on an as-needed basis.

We'll assist your company to exploit the profuse of tomorrow's information intensive future by delivering the most sought-after technical skills in the areas of Open Systems Architec-

ture, Client/Server Systems, Distributed Data Systems, Object-Oriented Structures, CASE and more.

Our professional services include:

- Management Consulting
- Systems Maintenance
- Systems Integration
- Network Integration
- Conversion & Migration
- Training & Education
- Production Systems Support
- Complete Project Staffing

Add a valued tool to your business strategy for the competitive 90's. Call the "Total Solution" professionals at Computer Horizons. Contact **John Sisto** at our corporate office. (201) 462-7400 or 1 (800) 321-2421.



Tomorrow's Solutions Today.

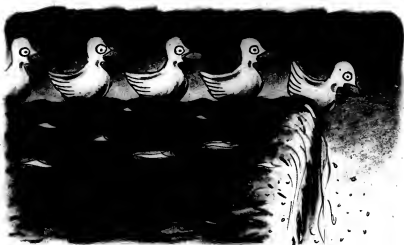
New York • Boston • Central NJ • Northern NJ • Princeton • Hartford • Philadelphia • Washington DC • Virginia
Miami • Atlanta • Raleigh • Phoenix • Denver • Des Moines • Chicago • Cincinnati • Dayton • Pittsburgh • Wilmington
Cleveland • Minneapolis • Columbus • Louisville • Indianapolis

[illegible][illegible]

Specialty Index

AGL	Albany Consulting Group, Inc.	(703) 243 0879	NJ	Pa 9	NACCS	(818) 841 2603	CA	19
	OMN Consulting Services Inc.	(866) 725 3801	CA		Netcom	(214) 435 8601	TX	19
	Orion Technology in Business	(818) 412 2345	OH	7	Repsol	(314) 434 8655	MO	12
	Support Systems	(866) 672 3151	CA					
AGL	TechnSource Inc.	(205) 635 0601	FL	12	Best Asia & Jamaica	(212) 687 3960	NY	101
Accounting/Payroll					Boyd Consulting Ltd.	(714) 295 8854	CA	19
	Alta Consulting Group Inc.	(713) 243 0879	VA	9	Dawright, Inc.	(703) 377 3191	FL	12
	Arthur Andersen & Co.	(800) 107 9625	IL	7	Orion Technology in Business	(714) 424 2345	CA	19
	Metec DC Inc.	(866) 647 0550	NJ	7				
	Metec Consulting in Business	(214) 613 2431	CA					
	Phase 2 Consulting Inc.	(800) 253 4433	FL					
	Support Systems	(866) 233 1151	FL					
ADAPTS	ADAPT Inc.	(206) 327 1210	WA					
Applications Development								
	ACANA Inc.	(206) 387 1210	WA	7				
	Ada-Info on Services	(800) 528 9082	MO	7				
	Ada Performance Resources Inc.	(361) 710 3600	MD	7				
	James Barr & Associates	(1786) 052 1821	NY					
	Claremont Consulting Group Inc.	(408) 481 1652	DH					
	Computer Horizons	(800) 257 1471	NJ					
	Dawright, Inc.	(703) 377 3191	FL					
	DeBorja & Hill	(800) 442 8261	IL	6				
	ODACCH Inc.	(800) 442 8261	IL	6				
	MCS Applied Concepts Inc.	(212) 726 1462	NY	7				
	Orion Technology	(714) 424 2345	CA	19				
	Phase Waterhouse	(314) 425 5165	MO	15				
	Pro-Value	(303) 448 3131	WA	18				
	Prosystem	(424) 612 0374	CA	7				
	S&L Softwarehouse	(212) 528 0208	NY	15				
	Supplett Stritzinger	(303) 525 7151	FL	12				
Assessments								
	KCA	(800) 438 4222	NY					
Automation and Control								
	Control XXI Inc.	(216) 631 2312	DH	8				
	Phase Waterhouse	(314) 425 5165	MO	15				
	Pro-Value Corporation	(800) 395 2238	NY	18				
Banking								
	Intelligent Financial Perspectives, Inc.	(916) 423 7964	TX	9				
	Orion Technology in Business	(714) 424 2345	CA	19				
	Phase Waterhouse	(314) 425 5165	MO	15				
	Pro-Value	(303) 448 3131	WA	18				
	Phase Waterhouse	(314) 425 5165	MO	15				
	Prosystem	(424) 612 0374	CA	7				
	Quattrini, Inc.	(314) 434 6652	VA	8				
B								
	Decision Software Systems	(800) 680 0174	PA	8				
	Hevett Packard Company	(800) 857 1743	CA	9				
CAL/CUDA								
	Hevett Packard Company	(800) 857 1743	CA	9				
	TechnSource Inc.	(205) 635 0601	FL	12				
CASE								
	Performance Resources Inc.	(361) 710 3600	MD	7				
	Carl A. Argus	(800) 277 4003	CA					
	Dawright, Inc.	(703) 377 3191	FL					
	Hevett Packard Company	(800) 857 1743	CA	9				
	Integrate Software Specialists	(786) 240 6160	IL	16				
	Metec Consulting	(214) 786 4827	NY	16				
	Orion Technology in Business	(714) 424 2345	CA	19				
	Phase Waterhouse	(314) 425 5165	MO	15				
	Pro-Value	(303) 448 3131	WA	18				
	Sea Technologies	(919) 285 0060	NC	8				
	TechnSource Inc.	(205) 635 0601	FL	12				

[illegible]



If your information technology is still based on mainframes, you could be a dead duck. To keep your head above water in the 90's, you need computer systems that are powerful, streamlined and more easily integrated and managed.

Enter SHL Systemhouse, a leader in one of the fastest growing fields in information technology — client/server architecture. Our expertise in the integration and management of client/server networks is just what you need to maximize your productivity, minimize your time and capital investment, and stay afloat during

**IN BUSINESS,
WHAT GOOD IS HAVING
ALL YOUR DUCKS IN A ROW
IF THEY'RE NOT POINTED IN
THE RIGHT DIRECTION?**

these sink-or-swim times. As your systems management partner, we can help you plan, build, implement and manage a system that meets your current and long-term needs, giving you more time to concentrate on your own business.

Before your future productivity goes off the deep end, talk with the information technology company with worldwide presence, depth of knowledge, and local support. So call Systemhouse today at 201-267-1219 and let us point you in the right direction. Also, ask how you can get a complimentary copy of *Client/Server Computing*, our total systems development reference book.



Empowerment Through Information Technology

Rocajon, Inc. (800) 432-4374
Applications programming and consulting. Ex-
perience in DB2, VS/2, AS/400, and C/COBOL. For
more information, call or write James Masco, 2080
Coble Pkwy, Suite 102, Atlanta, GA 30339

Arthur Elmgren & Co. (708) 586-1838
Accounting solutions for any size business. 15+ years
of DBS-MSA experience. DOS, Windows, and C/COBOL.
packages use client-server technology. PO Box 1973
Arlington Heights, IL 60006-1273 Fax: 708 586-9039

Melton DC Inc. (508) 641-8640
Consultants for all DBS Millennium products. Appli-
cations and technical specialty. HRM and SGT. our
specialty. Installation, customization, training, and
supporting. PO Box 351, Millington, NJ 07946-0351

SUPPORT STRATEGIES CONSULTING

We specialize in providing strategic
solutions to the use of Mainframe
Application Software Packages through

- Requirements Analysis
- Conversions
- Implementation
- Interfaces to related Software
- Development of customized User
- or Industry-specific Software
- Training & Documentation

Specific expertise in:

- DBS M Series Applications & Tools

Call 1-800-233-7151

Phase 2 Software/Conn, Inc. (800) 883-4336
10 year experience in DB2 & Broadway Tomlinson
products also offers RACF/2, TOPSEC/2, extended
security, Resnet/2, Callaway Tomlinson Phase
2 Conn, Inc. 21 N Garden St., Cumberland, RI 02864

ADA/NAT, INC. (206) 827-1218
ADABAS/NATURAL application development, design,
review, performance analysis/training. 5125C LASTITER,
5905 Fremont Ave. NE, Tacoma, WA 98422 USA. Fax
206 827-046

James R. Borte & Associates, Ltd. (708) 882-1381
Specializing in application development for PC and
Mainframe. Expertise in Rascal and Oracle. For more
information call/write Jim Borte, James R. Borte & As-
sociates, Ltd., 1508 Jefferson Rd., Hoffman, IL 60119-2518.

Performance ... not provision

That's why for over 16 years we've been
assisting our Fortune 500 clients to customize
all aspects of information lifecycle projects while
increasing quality and user satisfaction. Our
industry-leading approach, *The Method*, uses
JAD, CASE and IE to produce high quality
business models and application designs. We
offer both consulting and training services.

ATLIS Quality
Performance... not provision
Business Systems, Inc.
6011 Executive Blvd., Rockville, MD 20855
(301) 770-3000 Fax: (301) 488-6758

OMNITech
Consulting Services



Nationally recognized staff
specializing in

IDEAL DATACOM

Applications programming,
database design/administration,
system tuning and support.

ADA Information Technologies (800) 626-6982
We are a national management and applications
development consulting firm with a strong presence
in over 30 states and virtually every industry. We
are committed to providing our for turn-based clients
with a full range of services that include applications
development, project management and technical
support. Contact: Bob Rand, Director of National
Marketing, 1215 West Pennsylvania Ave., Ste. 850,
Towson, MD 21204. Fax: (410) 626-6708.

DataWright, Inc. (800) 277-3191
Specialists in AS/400 applications development using
upper and lower CASE application data models. Very
successful Fortune 500 client base. Call Frank Tor-
rence or Jerry Hanning.

WYSIWYG

WHAT YOU SEE IS WHAT YOU GET

WYDSMBWYN

WHAT YOU DON'T SEE MAY BE WHAT YOU NEED

WHYSWYN

WE'LL HELP YOU SEE WHAT YOU NEED

Origin understands there is usually more to
solving your problems than meets the eye. We
listen first, so together we can see what you
really need. We deliver real-life solutions
through 85 offices worldwide with expertise
ranging from Software Services to Systems
Integration to International Application
Support. WYDSMBWYN (When You Want To See
More), dial: 614-431-2345.



ORIGIN

TECHNOLOGY
IN BUSINESS

ORIGIN TECHNOLOGY IN BUSINESS, INC. U.S. HEADQUARTERS
115 SCHROCK ROAD, SUITE 818, COLUMBUS, OHIO 43229

ESA / SMS TRANSITIONING & AUTOMATION EXPERTS

Purveyors Consulting Services, Training & Education
of Innovative Program Products
Specializing in Successful Projects, Customer Satisfaction

FEATURE PROGRAM PRODUCT



Automated Tape Library
Management System

SLS - from Pro-Cubed Corporation enables users to manage
resources within the Automated Tape Library System, without manual
intervention. Through a process called LOGICAL EJECTION, datasets
and their associated volumes are copied from the automated system
to selected media, thus making the original tape volumes available
for use by other datasets. Manual tape library support included.

Additional Features of SLS Society

- Multi-Volume dataset support
- Multi-File Volume support
- EDC/Non-EDC Compression
- Tape-to-DASD Conversions
- Dataset Re-Stacking
- Dataset Stacking
- Catalog/Unstacking support
- Generic Dataset Filtering
- IBM/OLDS/FOI support
- Automated PHYSICAL EJECTION

Once installed SLS Society enhances your Automated
Tape Library facilities with features and functions that
make LIGHT-OUT OPERATIONS a reality.



Pro-Cubed Corporation
162 Highway 34, Suite 301
Maitland, NJ 07477

1-800-289-2238
Fax: 1-908-290-8082

CRA

Claremont Consulting Group, Inc. (800) 841-1002
Leading systems integrator specializing in CASE, process re-engineering and application development (ERP and packages). Major practices: Utilities, Petroleum, Investments, Government and Environmental. Contact: Steve Denney, Claremont Consulting Group, 1000 NW Compiton Drive, Suite 110, Beaverton, OR 97006.

ICCA, Chicago (800) 778-8911
The Independent Computer Consultants Association will refer the right consultant for just about any type of consulting requirement. Over 100 consultants locally and over 2,000 nationwide. To find consultants outside of the Chicago area, call 1-800-267-ICCA.

MCS Applied Concepts, Inc. (212) 752-7462
The "No Flit Consultant" was just made it work. Including total turn-key systems software, hardware, training, etc. More than 30 years experience.

Independent Comp Corps Assoc. (800) 638-4222
ICCA supports the success of all independent computer consultants. A not-for-profit national assoc. with chapters in major metro areas. 18th Annual Conference, May 13-15, 1993, in Tampa, New York.

Quattri, Inc. (214) 494-8888
Specialists in Banking/Lending Systems. We offer quality support for Desktop and CFI Mortgage Systems, Silver Consumer, ACAPS, AUS Commercial, Hogan and Custom interfaces to other Ancillary Banking Systems. Offices in St. Louis, Dallas, Los Angeles, and Phoenix, California. Quattri, Incorporated, 12577 North Outer Dr Drive E36, St. Louis, MO 63141-5843.

FOR THE BEST RESULTS
KNOWLEDGE AND EXPERIENCE
AT THE RIGHT PRICE

**Consultants Specializing in
Automated & Control**

- Software Development
- System Integration
- Manufacturing Industry
- Water & Wastewater Treatment
- Process Industry



Concept XXI Inc.
1611 S. Grant Road
Suite 300
Channahon, IL 61412
216-431-2121

DataWright, Inc. (800) 377-3191
Specialists in AS/400 CASE implementations, Application Data Models & Upper CASE analysis & design. Very successful Fortune 500 client base. Call Frank Fornace or Jerry Hurling.

KEEPR CONSULTING (215) 462-1861
Business case analysis, process reengineering, data modeling, Business Analyst, Shared Work Manager. Link for KDW, Knowledgeware 7 yrs, Business 3 yrs.

Newell-Packard Co. (800) 837-7740 Ext. 7236
Wide range of consulting & integration services worldwide. Trained professionals with experience selecting CASE technologies, standards, and products in HP and multi-vendor environments and SW development process assessments. Scheduled and custom classes worldwide. Topics include HP Software and Encapsulator CASE software tools.

Put SEER To Work For You

Seer Technologies specializes in the design and development of complex, large-scale applications software systems. As a joint venture of IBM and First Boston Corp., Seer has emerged as a leader in information engineering and CASE technology, with the resources and expertise to help organizations worldwide handle information processing more effectively and efficiently. If you have been seeking the best in information engineering, look no further than Seer Technologies, Inc. For more information, please contact: **National Recruitment Manager, Seer Technologies, Inc., 8000 Regency Parkway, Cary, NC 27511.**

SEER Technologies
The Systems Development Company



Interact
Information Services, Inc.

**TECHNOLOGY TRAINING
FOR BUSINESS**

Since 1984, providing technology training and education to help business meet the evolving challenges of today's competitive environment.

OUR SERVICES TODAY INCLUDE:

- Custom Training Development
- Corporate Curricula
- On-The-Job Coaching
- Technical Career Track Planning

CAREER DEVELOPMENT SERIES FOR:

NEW FOR '93

- Systems Analysts
- Systems Programmers
- Computer Programmers
- Computer Operators

1-800-628-5471
Interact Information Services, Inc.
65 Willowbrook Boulevard, Wayne, NJ 07470

Lotus

Consulting Services Group...

a division of Lotus Development Corporation, a worldwide leader in technology innovation and development, can help you achieve your business goals through technology initiatives in client-server computing and business change management consulting.

Staffed with business technologists, analysts, and consultants worldwide, Lotus CSG can help clients use technology to analyze, model, and implement business systems and the new business process changes, to provide critical solutions to complex business issues and problems.

Lotus CSG draws on unparalleled experience in designing, developing, and implementing business solutions using the new and emerging technologies that help multi-national clients respond quickly and effectively to their customers in cross-geographic, cross-functional, cross-platform environments.

Lotus CSG focuses on innovation at the enterprise level to bring about change, that is innovative and compelling, allowing clients to do more with technology than they ever thought possible.

Lotus CSG believes that the value of technology is not in what it does, but in how it is used to make our clients better able to respond to their customers needs for improved products and services at competitive prices and increased profitability.

For information on how Lotus Consulting Services Group can help your company address its business and computing issues with technology innovation, call us in Cambridge, Massachusetts at 617-493-4730.

Lotus.

Hevlett-Packard Co. (800) 837-7740 Ext 7236
Wide range of consulting / Integration services world-
wide / Trained professionals with experience selecting
languages and tools for HP and multi-vendor environ-
ments. Scheduled and custom classes offered worldwide
at your site or at HP's education centers, including ANSI
C and C++ programming.

Hevlett-Packard Co. (800) 837-7740 Ext 7236
Consulting services available worldwide. Trained pro-
fessionals with experience on HP ME CAD systems,
CAD databases, and design to manufacturing systems.
Services include education on implementation of
HP ME systems. Scheduled and custom classes world-
wide. Wide range of fundamental and advanced courses
for users and administrators of HP ME 10 and HP
ME 30 software.

Hevlett-Packard Co. (800) 837-7740 Ext 7236
Wide range of consulting/integration services world-
wide. Trained professionals with experience selecting
CIS standards and products for multi-vendor environ-
ments. CIS architecture design, integration with exist-
ing systems. Scheduled and custom classes. Wide range
of courses on client/server and open systems concepts
and updates. UNIX, network, and NIS management,
DBP, DCF, ODF, DME and more.

IPC Technologies, Inc. (800) 288-8900
Specializing in application development using 4th
generation Microsoft GUI environments, agent-driven
ROADS. Consulting for client/server implementation,
including Lotus Notes. Contact Jeffrey Brownstein.

Intelligent Financial Perspectives, Inc. P.O. Box 1528
Austin, TX 78767
(512) 343-7864

CLIENT-SERVER
TRAINING • CONSULTING • TOOLS

PowerBuilder™ Training
PowerBuilder™ Application Development
Financial Software Systems, Libraries & Objects
Object-Oriented Analysis and Design
Customized Training Programs

Call or write for more information or
a free issue of our newsletter
PowerSoft® Education Partner

LOGIC PLUS OPEN SYSTEMS, Inc. (708) 588-5887
Novell, AppleLink, SNA connection to UNIX/TCPIP
Migration planning from Wang, Prime, DG, other pro-
cessors and their associated client-server IBM/SP
technology. Enterprise messaging systems. Fault-tolerant
design for networks and servers to meet perfor-
mance and system cost/management. 201 Woodward,
Northbrook, IL 60062

PERICE ASSOCIATES (617) 482-3630
Specializing in the retrofit & downgrading of Minicom-
puter and Novell's NetWare File system are the primary
tools used for conversion. Experienced in the redesign
and migrating of data bases up to 70GB in size. Con-
tact Roger Perice, Perice Associates, 201 Lake View
Ave., Carlsboro, MA 03138

Hevlett-Packard Co. (800) 837-7740 Ext 7236
Consulting / Telecommunications focused and technol-
ogy focused consultants. HP delivers a wide range of
professional services, including quality improvement,
information systems strategy and planning, mainframe
engineering, client-server implementation, and network
management and operation focused on open systems
applications in BBS, CDS or a telecomm environment.

Savann Associates, Inc. (703) 267-8838
We specialize in networks, wide / local area and inter-
nets, SNA, X.25/SP, TCP/IP, Token Ring, Ethernet, FDDI.
Our services include consulting, design, performance,
troubleshooting, education, trouble shooting.

Alliant Consulting Group, Inc. (703) 243-6078
Business systems consultants, specializing in integrations,
systems, Computer Associates products, Delcam /
IDEAL/Masterpiece GL expertise. Member CA Consul-
tant Relations program.

BayTech Systems (703) 786-8807
Custom business software, MS-DOS, Windows, Con-
troller, PCs to mainframes. Over 16 yrs of software
development. PO Box 11719, Burke, VA 22009-1719.

T. Brady and Associates (909) 255-8238
AS/400 support, with expertise in Business Systems,
Manufacturing Control and Connectivity. Service New
Jersey. For more information call/visit Suite 206, Route
206, Somerville, NJ 08876.

Decision Software Sys., Inc. (800) 882-6794
On/Off Site Consulting Services (Programming, imple-
ment in Liquid-C, i, X-Window, and Communications
Systems. In Toronto, Oracle, DEC/VAX, Ada, France
Requisiemer Analysis/Design, Project Mgmt/Testing
R/V/M Real Time Systems, Pro case Control, MMS/MS,
test/BDD, Proposal Development, Marketing, Computer
Security. P.O. Box 647, Willow Grove, PA 19080.



The consultants may be
temporary. But we want
our relationships to be
permanent.

COMSYS supplies skilled computer consultants to some of the nation's leading
firms. Whether it's one consultant or a team of 40, COMSYS has qualified
people nationwide ready to serve you. And while their assignments for you
may be temporary, we hope their performance will make our relationship
with you permanent.

COMSYS.
computer project support

The right professionals. Right when you need them.

4 Research Place • Suite 300 • Rockville, MD 20850
(301) 921-3600 • Fax (301) 921-3700 • (800) 9-COMSYS

Atlanta 800-562-7862 Colorado Springs 800-289-1667 Dallas 800-653-7636 Denver 800-234-9454 Research Triangle 800-326-6797 Phoenix 800-726-6797 San Francisco 800-926-6797 Washington, DC 800-926-6797

BOOZ·ALLEN

A Balanced Approach





& HAMILTON

With mobiles or information systems, making strategy happen isn't easy. The sculptor or the systems consultant must envision the desired results from the outset.

Unfortunately, however, systems projects are too often viewed as linear exercises. Such an outlook ignores the myriad of interconnected, delicately balanced sources and uses of information, leading to systems that don't give executives what they need.

At Booz-Allen & Hamilton, we begin with an understanding of your overall business goals.

Our strategy-driven systems™ approach enables us to deliver systems that never lose sight of their original business intent... systems at the heart of our clients' business... systems that drive success.

Information Systems Group

212 697 1900

DRACS Consulting Group, Inc. (800) 727-1184
DCI, headquartered in Atlanta, GA, is an industry leader providing MIS Consulting Services. Our diversified team of 100 professionals are involved in application development, data analysis, project management, systems integration and network control. For MS, VMS, MVS, OS/2 and UNIX-based firms nationwide. DCI, Inc., 3341 Peachtree Rd., #1205E, Atlanta, GA 30328.

HOWARD SYSTEMS INT'L. (800) 726-0284
An information management Consulting Company serving Fortune 500 Companies since 1978 offers expertise in a variety of Mainframe, Mid Range, PC, Client Server, and CASE Technology services across the country. Call or write: Vice President, HOWARD SYSTEMS INTERNATIONAL, INC., 708 Third Ave., 28th Fl., New York, NY 10017

SDN Conson Inc. (516) 295-4541
Full Service Consulting and System Development, 81 Woodward St., Rockville Heights, NY 11577.

Quintec, Incorporated (314) 434-0895
We offer quality support for Programming, Analysis & Design, Systems Integration, Burkle Conversion, Package Conversions, Technical Training, Documentation, Interfaces and Specialized Applications. Offices in St. Louis, Dallas, Los Angeles, and Phoenix. Call Steve Smith, Incorporated, 170 North Court 40 Drive #316, St. Louis, MO 63141-6643.

Technisource, Inc. (201) 412-8601
National Service, The Right People, The Right Place. Our offices: 1601 NW 27 St., #401 F, Fort Lauderdale, FL 33309, 607-522-5886, 818-742-108, 800-857-1090.

Surflight, Inc. (800) 377-3191
Specialists in data design using upper and lower CASE tools with significant design completed in base AG-SD application data models. Very successful Fortune 500 client base. Call Frank Torrence or Jerry Hunsong.

Bee Application Developers, Inc. (907) 562-5848
Specialties in Database programming & design. Experience in PACS, ADABAS, and SYBASE. Contact Ken Farmer, 1708 E. 58th Circle, Anchorage, AK 99507

Howland-Paulard Co. (800) 637-7746 Ext 7236
Wide range of consulting/integration services worldwide. Trained professionals with experience selecting DB technologies, standards, and products in HP and multi-vendor environments. DB planning and design, DB reviews. Scheduled and custom classes with wide range of topics for users, programmers and administrators, including DB design, optimization, access, SQL, HP ALLBASE Software and HP TurboImage software.

Q-M Consulting Group (212) 995-6287
We do DOS and We do Windows (and the Macintosh) consulting brings 10 years of custom, PBIC design and development expertise in the PC environment to your organization. Serving everyone from the Fortune 500 to E-Serve firms. Q-M can build your IBMAS application for DOS, Microsoft Windows 3.0, or Macintosh systems. We specialize in using other MS Access, and C++ for more information contact Q-M Consulting Group, Inc. at 141 9th Ave., New York, NY 10013.

Online Systems Group (800) 327-6295
PROCES systems providing consulting, software development, and personal placement services nationally since 1967. Call Pam Barker for more information.

Disaster Recovery Services, Inc. (800) 335-3877
Capital/Disaster Recovery Planning and Design. Full range of Contingency Planning Services. Specializing in Risk and Business Impact Analysis and Contingency Plans - data center and organization-wide.

Raymond Professional Mgmt., Inc. (800) 587-6890
3755 Dogwood Rd "Box 109" Roswell, GA 30075. Site-consulting in Olan, Recovery / Corp. Continuity Plans. Independent consulting. For more information, call / write Jon Raymond.

Hewlett-Packard Co. (800) 637-7746 Ext 7236
Consulting services available worldwide. Trained professionals with experience in all phases of information systems recovery from planning and documentation to rehearse and hardware testing. Proven methods ensure fast access to the processing power, communications, and technical support needed to keep your critical applications running.

RALLY
Consulting and Training
Frederick Consulting, Inc. (206) 936-0482

RCS provides six years of nationally recognized consulting services for DEC RALLY, along with Roll-Design and support. A full range of options are offered to meet your needs. Application expertise covers a broad spectrum, from Part Maintenance to Pension Systems. For more information, call Steve Simon-Fredrick, Frederick Consulting Services 2722 37th Ave., S.W. Seattle, WA 98126.

ISA CONSULTANTS, LTD.
VAX/OpenVMS Experts
Specializing in DEC Services

Reduce costs by leveraging VAX professionals experienced in systems architecture, design, implementation, client/server, Alpha technology, troubleshooting and optimization.

For more information, call/telex Client Services Manager, ISA Consultants, Ltd., 223 W. Erie, Chicago, IL 60601, 800-452-6301.

S.Hess & Assoc., Inc. (215) 821-6196
Full staff, including on-site team problem at departmental level, review of pre-implementation planning, Phase I & II, require or call with MCI, 612-264-7422, FAX: 715-857-3195.

CALL NOW FOR
Dr. James Martin's

Video Education Courses are:

- Open-Ended
- Client Server & Databases
- CASE, Techniques & Methodology
- Integrating Information
- Management
- Reliability, Maintainability & Reengineering

CALL 1-800-526-0452

JAMES MARTIN
INC.

Training & Consulting

- Software Process Assessment
- Transition Planning To Object-Oriented
- Methods Training (SA, SD, RT, O-O)
- CASE Training and Implementation
- Out-Sourcing Services

Carl A. Arlita, Ph.D., Inc.
SOFTWARE ENGINEERING CONSULTANT
800-347-8903

Serard Software Engineering, Inc. (381) 417-8884
Specializing in object oriented Consulting, Training and programs. For more information call / write Serard Software Engineering, Inc., 101 Lafayette Blvd., Ste. 300, Gathersburg, MD 20677.

Dublin Group (415) 227-4747
Custom communications and learning solutions. Clients and user assistance/performance. Contact Mariela Scott, The Dublin Group, 100 First Street, Ste. 300, San Francisco, CA 94105.

EPCOM Corporation (313) 585-4760
EPCOM Systems Solution Services include Consulting and Application Development, Training, and a complete variety of Educational Services focused on today's emerging technologies. Call for free catalog. EPCOM, 671 E. Elmwood, Troy, MI 48063.

Expert Systems Consulting, Inc. (315) 436-5290
As fast, what you need to get the results you want a range of software and consulting services on structured and object methods or web CASE tools, on design for AI, and in problem-solving techniques. Avoid tasks associated with new methods. Learn from seasoned veterans. Consult Expert Systems in the practical application software methods. Call us now and see how.

Hewlett-Packard Co. (800) 637-7746 Ext 7236
Scheduled and custom classes worldwide. At HP or at your site. Wide range of topics for technical staff, administrators, operators, programmers, and users including UNIX/MS, operating systems, client/server, open systems, networking, programming languages, CASE, databases, graphics and more.

JMH Consulting (800) 872-9575
Specializing in PL/I/RTN programming on IBM Mainframe/PL/I. Over 20 years' hands-on experience. For more information please call/telex/jmh/JMH Consulting, PO Box 725, Caryville, VA 22617.

JOHN DORSEY & ASSOCIATES (313) 642-2420
Management and Information Systems Consulting for Government, Public Safety, and Commercial organizations. P.O. Box 19637, Little Rock, AR 72216.

MMA Consulting Group, Inc. (617) 426-4548
Independent consultants to local/state governments. National projects covering all specialties. Fee-based, project-oriented, no retainer. Please contact Stephen S. Cohen, VP of Finance, MMA Consulting, 100 State St., Boston, MA 02111.

Howland-Paulard Co. (800) 637-7746 Ext 7236
Wide range of consulting/integration services worldwide. Trained professionals with experience selecting DB technologies, standards, and products in HP and multi-vendor environments. Scheduled and custom classes worldwide. Wide range of topics for users and administrators, including DB design, optimization and advanced SQL courses that cover K. Williams, ODB/MS/HP hardware Architecture, HP VMS, system and more.

Hevelitt-Packard Co. (800) 837-7740 Ext. 7235
Professional services including consulting, IT, education, site design/implementation. Worldwide technology expertise on open systems, client/server, HP systems, SBT strategy, maintenance alternatives, information integration, and networking. Professionals to help meet project timelines, achieve quality results, add value of HP experience/knowledge, and support you into the future.

Delwale Consulting, Ltd. (212) 680-8008
SBA mainframe system maintenance, development and conversion. Mary Delwale, Delwale Consulting, Ltd., 231 East 14th St., #2, New York City 10003.

Technology Consulting Corp (TCC) (414) 752-1111
Full-term consulting support, specializing in AS/400 and CASE technology, with offices in the Milwaukee and Chicago metropolitan areas to serve clients through the Midwest. For more information, contact Curt Richards, Technology Consulting Corporation, 900 N. Corporate Drive, Brookfield, WI 53005.

ES&C (703) 739-2242
Information Engineering Sys. Corp. (ES&C) is a major & info tech consulting firm that specializes in information engineering (IE). We provide facilitation, education, training & consulting prior, during or post implementation. Additionally, we provide CASE (IE Advantages) products to help corporations and universities to improve their business & info sys. ES&C is uniquely able to offer integrated methodology and CASE solutions because of our exclusive focus on the field we engaged & continue to pioneer. 201 N. Union St., 5th Fl., Alexandria, VA 22314.

DataWright, Inc. (800) 277-3191
Specialist in applying information engineering techniques to AS/400 with expert & lower CASE Application Data Models. Very successful Fortune 500 client base. Call Frank Tomczak or Jerry Huang.

Performance Development Corp. (800) 554-9131
Education and consulting services in Business Reengineering, Right Sizing, SAP, BAX, BSO, ISO, Construction, HR, Data Administration, Life Cycle Methodologies. Both short and long term.

DATA ARCHITECTS

- Information Resource Management
- Data Architecture Development
- Enterprise Modeling
- Business Area Analysis and Process Reengineering
- Migration Strategy Planning

Significant impact and added benefit to your organization
Available worldwide with a 24-hour basis of service knowledge

Contact Barbara J. Helmer
at (404)233-5067 for more information

DATA ARCHITECTS, INC.

Bradley Company (212) 252-7226
Specializing in PC / LAN design for Inventory Control/Organization systems of consumable supplies. For more information, contact Jeff Roberts.

MG Rush Systems, Inc. (708) 304-1884
Specialists in "JACO" facilitation and the world's best facilitator training. Please call or write: Gary or Mike Rush, MG Rush Systems, Inc., P.O. Box 3118, Berrington, IL 60010.

Hevelitt-Packard Co. (800) 837-7740 Ext. 7235
Wide range of consulting/integration services worldwide. Trained professionals experienced in selection and implementation of standards and products for multi-vendor networks, physical and logical network design, network installation & support, network/system management, scheduled and custom classes worldwide, including LAN Fundamentals, LAN Manager, and multi-vendor networking.

Hevelitt-Packard Co. (800) 837-7740 Ext. 7235
Wide range of consulting/integration services worldwide. Trained professionals with experience selecting languages and tools for HP and multi-vendor environments. Scheduled and custom classes worldwide. Wide range of topics, including ANSI C++, object-oriented programming, Pascal, FORTRAN 77, and more.

Nahmias & Company (203) 244-7579
Management consulting and research, including computer intelligence, business reengineering, and strategic planning. Contact Rich Nahmias, CityPlace, 31st Floor, Hartford, CT 06183.

Are you interested in optimizing your Information Systems investment?

Albright Consulting would like to help.

Our consulting and contract services range from mainframe systems to the personal computing platform.

We work in various industries including manufacturing, financial services, health care and data communications - and offer expertise in many practice areas...

- Performance Measurement & Tuning
- Capacity Management
- Network Performance Analysis
- Client/Server Integration
- Hardware & Software Technology Assessment
- Customized Education & Training

Why should we assist?

Because more than interest, you will have our undivided attention. And we deliver.



ALBRIGHT CONSULTING
234 E. Morehead Street, Charlotte, North Carolina 28202
(704) 377-2669



There's something special about specialists...They do a better job.

And that's what Robert Half® and Accountemps® is all about...qualified permanent and temporary information systems, accounting and financial professionals. Companies have relied on us for professional, prompt and cost efficient service since 1948. We have 150 offices worldwide. Call us today.

1-800-458-5700 Ext. 79

ROBERT HALF

accountemps

©1992 Robert Half International, Inc. All Rights Reserved. Registered

WEISER AND WEISER Pacific Management Institute

Since 1976, providing a foundation for success with people, organizations, change, and technology through:

- teams
- strategy
- recruitment, selection & assimilation
- integrative management methodology

We are: creative, collaborative, effective, experienced (a two-person team with 60 years of experience in: IT Management, Systems, Consulting, Teaching). Chosen over larger firms by discerning clients nationwide and internationally.

Paul and Jan Weber
(800) 678-9679 (503) 247-8326
Box 328, Grid Beach, Oregon 97144-0328
325 Pine, #1300, San Francisco CA 94104

Strunk Software & Consulting (800) 427-7480
Specializing in custom modifications for American Software's order processing, purchasing & materials management products, MYC, (SII & AS500). For more information please call Strunk Software & Consulting, Inc. 1127 Pamela Circle, Marietta, GA 30060

Hewlett-Packard Co. (800) 837-7740 Ext. 7239
Wide range of consulting/integration services worldwide, including manufacturing focused centers of expertise. Trained professionals with experience in applying technology to solve manufacturing industry business issues. Scheduled and custom education available, including fundamental and advanced courses for administrators, supervisors and users of HP Manufacturing Management software.

CASI/MATE Inc. (800) 448-5404
Specializing in Strategic Planning, Automated Methodology, CASE-USE Training, Modeling, Data Administration and Windows SQL based Client/Server implementation using PowerBuilder CASI/MATE Inc., 3952 Swelling Hollow, Norcross, GA 30092.

SSA Systems Software Technology Group

The leader in Automation Planning, Implementation, Product Conversion and Training

- Console Automation
- Automated Production Control
- Job Recovery
- Output Distribution
- Problem/Change Management

Fixed Price, Fixed Deliverables... Guaranteed

For more information call:
800/472-1018

Sara Tolheim and Associates (508) 884-1452
Specializing in systems management disciplines. Expertise in scheduling system conversions, problem change and emergency systems implementation and customization. For more information, please call Sara Tolheim, Sara Tolheim & Assoc., 220 Clifton Drive, Santa Fe, NM 87501

Stufko, Inc. (203) 622-3906
Porting Specialists. Our unique approach to porting provides fast, accurate solutions for any port. Callwrite R. Lofgren, Two Greenwich Plaza, Suite 100, Greenwich, CT 06830.

Hewlett-Packard Co. (800) 837-7740 Ext. 7239
Wide range of consulting/integration services worldwide to clients needs, develop strategy and architecture, identify, implement, customize, and integrate solution. Scheduled and custom classes including HP OpenView network node manager for network administrators and operators.

NCS (800) 782-7238
COMPUTER NETWORKING SIMPLIFIED Design/Installation/Training/Support Hardware Software Consulting. For detailed information please call or write Networking & Communications Solutions, Inc. PO Box 1194, Orange, CT 06477

OFFSHORE SOFTWARE DEVELOPMENT IN INDIA

Offshore software development today is a multi-billion dollar industry, growing at an annual rate of 20+%

...and programs to help you up the...
environment cost benefits offered. We can help you knock 30-40% off your current development costs with much better results.

Our success has come from our conservative approach in taking on projects that are true win-win situations. We specialize in downsizing, porting, converting or migrating your computer environment towards Open Systems.

To receive a FREE comprehensive information package on offshore software development or to arrange a meeting with your account manager, please call: 1-800-476-7374.

TransTech
the global perspective
TransTech, Inc.
One Energy Center, Naperville, IL 60563
Tel. (708) 717-0000 • FAX (708) 717-0000

When multiple vendors become multiple headaches, you need the multiple talents of CSNA.

If the dream of open systems distributed environments is becoming a nightmare, call on the expertise of CSNA to help you keep pace with today's technology advances.

CSNA's highly skilled network experts have helped industry giants implement complex client server solutions. From downsizing to rightsizing, we offer feasibility studies which determine the most cost-effective solution for your enterprise while optimizing your existing investment. Our experts continually maintain the right skill sets to design, implement, and fine-tune your network. And with our remote proactive network management service, SUPPORTlink, we can detect and correct network problems - in most cases - before you or your users even know you have them.

You don't have to go it alone. Call CSNA's network experts at 201-887-1000.

Ultimate
computer support & maintenance
717 Ridgeville Avenue, East Rutherford, NJ 07070

Information at your fingertips

Integration, Rightizing, LAN, WAN, Software Development

Our professional certifications include:
Microsoft Network Specialist
Novell NetWare Engineer
Microsoft SQL Server
DCA Comm Server
Microsoft Solutions Partner
Computer Associates ACCPAC

Our clients range from Fortune 500 to small business firms. We offer experience with IBM Mainframes, SNA networks and traditional desktop based networks. Custom solutions are our specialty.

DGS Electronics

4 West West Plaza, Albany NY 12240 518-469-1305

CSNA, a div/Ultimate Corp. (911) 817-8222
Network experts specializing in downgrading, upgrading. Our total migration solution encompasses overall system evaluation, hardware, software, processing objectives: network design, installation, and implementation and configuration. CSNA's SUPPORTIVE product. For more information, call CSNA, a division of The Ultimate Corp., 111 Regent Ave., East Hanover, NJ 07936.

IBM Greater Chicago LAN Practice (708) 757-7217
Specializing in multi-vendor network design, implementation and performance analysis. Expertise includes LAN/WAN to internetworking. For more information contact Doug Boley, IBM 2707 Butterfield Rd., Oakbrook, IL 60521.

Hewlett-Packard Co. (800) 837-7749 Ext 7235
Wide range of consulting/integration services worldwide. Selection and implementation of standards and products for multi-vendor networks physical and logical network design, network installation & support; network system management. Scheduled and custom classes: LAN and WAN technologies, multi-vendor network design. LAN Manager, X.25, & 400, TOPIC OSL HP OpenView Network Mgmt Prod. OSF DME and more.

NETLAN Inc. (312) 788-2273
NY's first Novell Platinum Integrator providing network design consulting, installation, maintenance, support services. Cert. NAEC, IBM, Compaq, UNIX, 2nd 28th St., NY, NY 10018.

CONDOR CONSULTING LTD. (312) 781-6864
Object oriented analysis/design for multi-platform client/server. GUI environments. Call Garth E. Lighted for more information.

Hewlett-Packard Co. (800) 837-7749 Ext 7235
Scheduled and custom classes conducted at HP education centers or at your site. Topics for software development professionals include object oriented analysis and design techniques, C++, and more.

Comp Science & Sys Eng Consult. (719) 580-8418
25 yrs exp. in Operating System Support/Tech services on IBM Systems, IBM PC/XT/AT, System Evaluation/Development; P.O. Box 62217, Co. Springs, CO 80962-2217.

Remote Computing

MYIS and VM Environments
• Facilities Management
• Consulting & Programming Support
• Functional Outsourcing

PWC

Message Through Understanding

PWC Inc., 1500 PWC Drive, McLean, VA 22102

Achieving Excellence in Customer Service for 25 Years

Call us at 1-800-531-5489 for a flexible, cost-effective solution, custom tailored to meet your needs.

Executive Technologies (815) 732-5242
Oracle VARS, Design & Development, CASE, Financials, VMS, AIX, Unix, OS/2, C/3p, 2520 E. Davis Blvd., Naperville, IL 60563.

PRIOR COMPUTER SERVICE, INC. (312) 589-6667
Oracle database design and programming in a development environment: Windows to UNIX, John P. Prior, Prior Computer Services Inc., 6330 N. Harlem Ave #102, Chicago, IL 60655-4714.

Linknet, Inc. (714) 854-3322
FAX: (714) 854-3312. Pen PC Mobile Connectivity Solutions: Wireless Communication, Spoolshare, Intelligent Remote Information Transfers: Customized Applications & Systems Integration Services.

Leaders In The Deployment & Integration of Strategic Technologies to Enable BUSINESS PROCESS RE-ENGINEERING

Business Process Re-Engineering: "A fundamental change in business processes with consideration given to how technology can boost productivity and competitiveness".

Strategic Technology: "A technology that Corporations cannot ignore if they want to be competitive in the future".

Business Re-Engineering



- Leverage the most advanced technologies to support your Business Process Re-Engineering efforts
- Maximize your investment in existing systems with the latest re-engineering and maintenance technology.
- Migrate existing software systems into a client/server environment or to different platforms.
- Reverse Engineer your EXISTING systems into a repository-based development environment.
- Call ISS today and find out why our customers refer to us as "partners".

"Dedicated to Decreased Cycle-Time, Superior Quality, & Reduced Cost"

ISS Specialties

AI/Knowledge Based Tech. X
AI/Neural Net Tech. X
Image Proc. & Management X
Reverse Engineering (CASE) X
Graphical User Interface X
Electronic Data Interchange X
Object Oriented X
Touch Screen, Light Pen, & X
Voice Recognition X
Forward Engineering (CASE) X
Client Server. X

INTEGRATED SOFTWARE SPECIALISTS

1701 East Woodfield Road, Suite 419 Schaumburg, IL 60177
TEL 708 240 5073
FAX 708 240 5073



Best-In-Class People Services Trainer

S.A.B.

Hewlett-Packard Co. (800) 837-7748 Ext. 7225
Consulting integration services worldwide to help you accelerate your competitive advantage. Trained project managers and project management services that give today's custom solutions to meet tomorrow's business challenges. HP's project management methodology integrates quality delivery, customer satisfaction, your business results, and on-time delivery of project results.

IBM SYSTEMS INC. (713) 268-6660
Expertise in IBM or compatible computers. From main frame to PCs, to operating systems and software, to multimedia and sound system design. IBM can plan, install, monitor and tune your systems. For information, please contact Frank J. Jones, IBM, 35 E. Main Road, Downingtown, PA 19335-1442 or Computer, ID: 70-354-177

The Electronic Cottage (313) 732-6605
Performance Tuning and Capacity Planning for MVS systems. Systems considerations. Processor Storage Analysis. DASD Subsystem analysis. FAS/DBM members turned. Very experienced. Inexpensive. No toll used you are satisfied. Call subcontract through IBM.

Bates Project Management Inc. (800) 262-9995
Integrated project management consulting, methodology and training services. Contact Sandy Mathison, Bates Project Management Inc., 20 River St., Ottawa, Ontario K1S 2S2.

Delphi International, Inc. (201) 861-7164
FAX: 201-861-7214 Business and systems consulting. Anthony Rodriguez, President. Delphi International, Inc., 7800 Boulevard East, Suite 391 F, Glenview, New Jersey 07033

Hewlett-Packard Co. (800) 837-7748 Ext. 7225
Consulting integration services worldwide to help you accelerate your competitive advantage. Trained project managers and project management services that give today's custom solutions to meet tomorrow's business challenges. HP's project management methodology integrates quality delivery, customer satisfaction, your business results, and on-time delivery of project results.

D. Appleton Company is a business engineering firm that offers services and products for improving organizational performance, reducing costs, and increasing revenues. Since its founding in 1848, D. Appleton Company has assumed a leading role in achieving change in business. D. Appleton Company provides:

- Consulting
- Management
- Information Systems
- Education and Training
- Publications
- Software Development
- Software

Areas of Expertise:

- C.A.S. (Computer-aided Acquisition and Logistics Support)
- C.I.E. (Computer Integrated Engineering)
- C.I.M. (Computer Integrated Manufacturing)
- C.I.E. (Computer Integrated Engineering)
- C.I.E. (Computer Integrated Engineering)
- C.I.E. (Computer Integrated Engineering)
- C.I.E. (Computer Integrated Engineering)
- C.I.E. (Computer Integrated Engineering)

To request a copy of the Business Engineering Handbook, call 1-800-322-6614.



Hewlett-Packard Co. (800) 837-7748 Ext. 7225
Consulting integration services available worldwide to help you solve your systems integration problems and implement them. Expertise in migration processes and target systems based on open computer architectures. Services covering information strategy, analysis, information technology selection, transferring to the new environment, pilot testing, full implementation and deployment, support and education.

Spring City Software (718) 488-6600
Specializing in SAS and PC-based applications. Contact Donald Tynny, 100 Barton Drive, Spring City, PA 15475

Synergy Group, Inc. (703) 627-3644
Solutions to business report. Changes from existing Database/Control, Open Systems based strategy, design & technology support. 7700 Leesboro Rd., Suite 100, Fairfax, VA 22031

Risk Consulting Services (800) 945-2978
Specializing in software Quality Assurance and testing at all phases of development. Expertise in CASE and ORACLE. Training available. Contact: Randy Risk, P.O. Box 88126, Oklahoma City, OK 73156.

Utility Systems Corporation (800) 248-5647
Specializing in software testing. Solutions to software development organizations on a wide variety of software and hardware platforms. 5625 MacArthur Blvd., Suite 2573, Irving, TX 75038.

Database Design Solutions (800) 425-3727
Specializing in the revitalization of corporate databases. Repository implementation specialists. Adrienne Tannenbaum, President.



ALICOMP, INC.

The "Boutique"
of the Computer Services World

Outsourcing Consulting Services:

- Data Center Operations
- Transactional Downloading
- Application Development
- Systems Programming Services
- WAN & LAN Design and Administration

EXCELLENCE IS OUR PASSION!

Serving Clients Since 1980

Two State of the Art Locations:
20,000 sq. ft. Manhattan complex
100,000 sq. ft. Secaucus, NJ complex

(212) 886-3600 (800) 274-5556
Fax (212) 691-2962

Information Technology Consulting


We Listen... We Deliver

Deloitte & Touche information technology consultants bring to each client engagement a **BALANCE** of business acumen and technical expertise. We combine that with broad experience in many industries and functional areas.

As a result, we've built a reputation as the business-oriented consultants with deep technical experience—the professionals who offer well-conceived, implementable **SOLUTIONS** to your business needs. In working with you, we determine the **Business Opportunity** or solution to a problem before we select the **technology** solution. And, as our professionals have demonstrated over the years, we have the insight and perspective to determine when it is practical and cost-effective for an organization to implement a new technology.

We can help you with: strategic information system planning, system integration, application development (custom/packages), management review and analysis, data center activities, telecommunications (voice and data), emerging technologies (multimedia, object oriented design, 3D/4D implementation, client server) and Computer Assurance Services (computer security, control implementation, continuity and continuation).

For more information, call or write William Atkins, Deloitte & Touche, Ten Westport Road, Wilton, CT 06097. Phone: 203-763-1361.



Central Technical Services (904) 284-4251
FAX: 904-964-7541 Contract Staffing, Banking, Insurance,
Power Generation/Industries, Term Contract, 550 W. Wells
Rd., Orange Park, FL 32073

ROMAC/DP
Specializing in the placement of DP professionals
throughout the United States. ROMAC/DP offices are
listed in the State index

D.C. Consulting Inc. (515) 964-9034
Planning for results - refreshing, cross platform, novel
system integration for PC, Macintosh, VAX and MVS
Savoy, Conn. D.C. Consulting Inc., PO Box 599,
Avon, CT 06001

SRM Associates, Ltd. (516) 433-1817
Consulting & educational services: performance
analysis, capacity planning, changeback, reporting
systems, application sizing, database analysis, struc-
tural/architectural planning & resource management
across all platforms. Contact: Jerry Rosenberg, 12
South Oaks Blvd., Flamingo, NY 13623-1025

CSC Partners (617) 647-0118
Leading systems integration firm providing technical
and management consulting services. Fortune
1000 companies throughout the U.S. CSC Partners is
a company of SCS SofCom Computer Sciences Corp

SYSTEMS INTEGRATION & CONSULTING SERVICES

EXPERTISE IN:

- ORACLE • WINDOWS NT
- UNIX • OBJECT ORIENTED
- PICK TECHNOLOGIES

JPD
ASSOCIATES

Phone: 1-800-594-0201
Fax: (915) 584-2160

ECS Associates, Inc. (714) 320-2062
Provides UNIX server system design and integration
with a range of software tools and services including:
CASE tools, modeling services, start-up assistance, net-
work managers for LAN and WAN with leading Sun
Net and HP based tools, and high-end graphics edit-
ing tools for professional technical productivity. ECS
specializes in network "help-desk" automation sys-
tems

Hewlett Packard Co. (800) 637-7746 Ext 7235
Experienced, worldwide professionals who can act as
prime contractors to provide tailored solutions to help
you implement open systems, client/server technologies
in areas such as: multi-media alternatives, information
integration, and networking

ISA CONSULTANTS, LTD. (800) 482-6301
VAX/Open VMS experts in system development, inte-
gration, and training. Callwrite: Client Services Mgr.,
ISA Consultants, 223 W. Erie, Chicago, IL 60610-8040
6301

PITTSBURGH BUSINESS CONSULTANTS, INC.

PBC employs over 300 computer
professionals with diverse background
& experience. We provide the best
professionals at competitive rates. Our
services include:

**Strategic IT Planning
Software Design &
Development
Disaster Recovery
Outsourcing & Facilities
Management
Staff Supplementation**

To learn more about our full range of
capabilities, call, fax or write us:

**PITTSBURGH BUSINESS
CONSULTANTS, INC.**

JW & ASSOCIATES, INC. (708) 515-2695
Certified professionals insure high quality results
when developing or integrating systems. Callwrite
Eric Kruse, JW & Associates, Inc., 113 McHenry
Rd., Suite #196, Buffalo, NY 14203

We Make Information Work.

Marathon Systems is the West Coast leader in the
design and implementation of mission critical client/
server and PC-LAN applications. Marathon combines
the latest in technology with a proven design methodol-
ogy to deliver true business solutions. With a dynamic
methodology specifically designed for the client/server
environment our clients benefit from our use of the most
appropriate development tools in a proven structured
systems development environment.

We assist our clients through a variety of systems
consulting and integration services that include:

- Custom Application Development
- Project Management
- Systems and Architecture Planning
- Network Integration
- Technology Support

When your project calls for high quality but low risk, call
Marathon... many of the Fortune 1000 already have.

MARATHON
SYSTEMS

41 Embarcadero, 7th Floor, San Francisco, CA 94111 (415) 362-0500

Hughes Software Process Methodology

The Hughes Software Engineering Division, as a
world leader in software process technology, can
help you improve your software process maturity
so that you can develop software at a lower cost, on-
schedule and with higher quality. The process
methods and tools developed at Hughes have made
the concept of software process maturity practical
for every company, large or small. Hughes has
been recognized by the Software Engineering In-
stitute as the leader in software process maturity.

Hughes provides process assessment, process
definition, process tools and training. What Hughes
offers your company can't be found in a textbook,
a college classroom, a seminar or any other single
source.

For more information, please contact:
The Software Engineering Division
Hughes Aircraft Company
(714) 732-2922 or (714) 732-2866 (fax)

HUGHES

GRU

System 813, Inc. (814) 425-7158
Everything for RACH: installation, sale, education, implementation reviews. Call/Write: Daniel Aronson, SYSTEM 813, INC. 1245 Strawberry Hill Road, Morrey, NY 10862.

Trusted Information Systems, Inc. (301) 854-6889
World leader in advanced information systems security consulting and MLI solutions. Please write/call James Uchito, 3080 Washington Rd., Glenwood, MD 21738.

An-de-In Computing Company (415) 331-2224
Specializing in the design, analysis, and capacity planning of Tandem and BSM systems. Call Larry Watson, US Pacific Time.

Hewlett-Packard Co. (800) 637-7748 Ext 7235
Worldwide consultants/instructors to assist with UNIX systems strategies, implementations, education, support. Focus on industry standards and HP systems implementations. Schedules and custom classes for technical managers, administrators, operators, programmers, and users. Applicable to most versions of UNIX. Topics: OS fundamentals, system admin, security, networking, performance, programming, GUI, graphics, data management.

REX Software Services (515) 877-8925
Specializing in UNIX, C++, ORACLE, SYBASE, and Networking. We provide competitive pricing with option to lease. Please call/write: Lela Keador, 47 Lafayette Circle #210, Lafayette, CA 94548.



KL TRAVEL SYSTEMS
TELEPHONE 800.844.7557
FACSIMILE 800.844.8595

"We Want to Share A Vision With You!"
"We're #1 In Our Service Applications in the Travel Industry"

Isely/Griggs Assoc. Inc. (800) 255-0438
Specialists in business office automation. We are recognized experts in DEC Office products, Electronic Mail, Convergence, Networking, FAX/VOICEMAIL, Client/Server Applications, Application Integration, Work Flow Automation, Site Design, and Site Mgmt. Member of Digital Equip Corp's SV Program (Independent Software Vendors) and are authorized dealers of VAX Workperfect products. Call/Write: Anthony B. Isely, Isely/Griggs & Assoc. Inc. 19 E. Central Ave., Paoli, PA 18301-1380.

GPO Software Assn. Inc. (215) 344-8573
VAX/VMS System/Cluster Management, Security, Performance & Capacity Planning, Data Center Management, Software Installation/Upgrades, Cluster Migration, Remote System Support, Custom Training, Project Management/Planning, Contract Planning, Software Development, VMS DOS, Windows, Unix, CO-RT, SAS, QRC, 30 E. Swinford Rd., Mawson, PA 19385.

The Noble Group (415) 576-8389
We are specialists in Communications Software, Analysis Software Development, Training, Multi-Media environment, LANs, On-Line RDBMS Databases, and Training. For more information call/write: The Noble Group, PO Box 8258, Foster City, CA 94404.

VM Concepts Inc. (802) 873-2889
VM consulting and marketing of integrated REXX tools for programming along with customized inventory systems. For more information please call/write: Larry Christensen, VM Concepts 9646 S. Zinnia St., Littleton, CO 80127.

IBM and MSN are trademarks of the International Business Machines Corporation. UNIX and other operating systems are trademarks of AT&T Intellectual Property. Other names may be trademarks of their respective owners.

PRICE WATERHOUSE CONSULTING CHANGE INTEGRATION & INFORMATION TECHNOLOGY

**DELIVERING
TECHNOLOGY
BASED
SOLUTIONS
FOR BIG
PROBLEMS.**

Our **CHANGE INTEGRATION** methodology has helped many companies realize dramatic improvements by dealing in an integrated manner with all aspects of change:

- culture and people
- structure
- systems and processes
- technology

Systems using advanced technology are typically a central element in realizing the benefits of change. We are in the business of **DELIVERING TECHNOLOGY BASED SOLUTIONS FOR BIG PROBLEMS.**

We are unsurpassed in the way we combine:

- industry,
- application and
- technical knowledge

while working effectively in **YOUR** culture and environment.

Give us an opportunity to tell you about our client successes. Please refer to state/specialty indexes for your local Price Waterhouse consulting office.

Price Waterhouse



Contracts

The nation's leading Computer Consulting Businesses have joined together to present you with a world of Contract Opportunities!

The following members of the National Association of Computer Consultant Businesses (NACCB) have banded together to inform you all of these fantastic contract consulting positions at Fortune 1000 companies nationwide.

WEST

Commercial Programming Systems, Inc.

2350 Wilshire Blvd. Suite 1212
Los Angeles, CA 90010 1602
213/260-5481 • FAX 213/269-2403

DATA DESIGN CORPORATION

SOUTHERN CALIFORNIA
Voice (414) 981-5511
FAX (714) 995-8569

Executive Systems Group

3333 Bowers Ave., #200
Santa Clara, CA 95054
Call (650) 970-8595
FAX (408) 970-8603
CALL NOW & DISCOVER THE DIFFERENCE!

Computer Stars On The Rise

Whether you're looking to catch a rising star or hoping to find a place that needs your computer expertise, think PMAI!

Computer & Engineering Contracts
For more information on how we can help you, call

P. Murphy & Associates, Inc.

4008 Riverside Drive, Suite 100,
Burbank, CA 91505
(818) 841-2032 FAX (818) 841-2122

Capitalize on your technical expertise. Put yourself in a more rewarding position. Make a better future with the National Association of Computer Consultant Businesses (NACCB).

The NACCB is committed to maintaining high ethical standards in the field of technical consulting. Representing the Nation's most reputable contract consulting businesses, the NACCB defends the rights and supports the interests of the Professional Technical Consultant. For more information on the NACCB and what it can do for you, contact any of the companies above.

Lloyd, Ritter

1043 N. Shoreline Bl.
Min. View, CA 94043
Tel (415) 954-6644
FAX (415) 954-8719
Consulting in Silicon Valley since 1979

STATEWART

1111 North Loop West, Suite 800
Houston, Texas 77008
(713) 880-6232
(713) 889-6938 fax

TECHNOLOGY LOCATOR

"The Right People For The Job"
No Call Contracts
• Information Systems
• Software Engineering
Call: 800/275-4852
Fax: 619/552-6820

MIDWEST

Interactive Business Systems, Inc.
2625 Sutherland Rd., Suite 114W
Oak Brook, IL 60021
708/571-9100

Manufacturing
& PC Consulting
Contract From Detroit, MI
Bob Olson, Manager of Recruitment

JasTech, Inc.

Cleveland, Ohio
(937) 366-7600 • FAX (216) 586-0185

HOGAN, BELL, UHLER, C+ C
SINCE 1945, YALOW, YALOW, EDG, ORLICK
Client Service, AS/400, Case Tech

MRJ

ASSOCIATES, INC.
P.O. Box 1724 • St. Louis, MO 63103
314/634-1976 • FAX 314/634-1952

NORTHEAST



Regal Data Systems

285 Davidson Avenue
Somerset, NJ 08873
908-469-4227
FAX (908) 469-5305

"... answers to questions,
solutions to problems"

Regal Data is a world class consulting firm specializing in state-of-the-art technologies.

Assignments in NJ, NY, PA, VA, CA and Europe

DB2 or ORACLE
ADABAS, NATURAL
POWERBUILDER
SYBASE or SQL-SVR
MS-WINDOWS, C+
ADEPT, INC.
888 Worcester Road
Wellesley, MA 02181
1-800-662-3378 or
FAX (617) 237-0892

SOUTHEAST

Atlanta Southeast

Brannon & Tully, Inc.

3800 Highway 91, Ft. Lauderdale, FL 33308
404-447-8773 PW
404-729-9803 FAX
Top Rates & Salaries
401K, Dental, 401K, Etc.

SUNBELT

Computer Consulting Group
1-800-323-1773
FAX (803) 738-9123

MINDBANK

Consulting Group
1500 Leasing Plaza, Suite 700
Vienna, VA 22182
1-800-664-2234
1-703-892-4700
fax 1-703-211-3238

TEAM

INFORMATION SERVICES
549 W. Lk. Mary Blvd., Suite 306
Lake Mary, FL 32746
(800) 676-TEAM
FAX (407) 324-8566

TCI

TECHNOLOGY CONSULTING, INC.
MAINFRAME MIDRANGE
PC - CLIENT SERVER
(800) 829-4824
1800 Washington Ter., Louisville, KY 40202
FAX (502) 389-5187

ALTA Technical Services

Embedded MP Dev't, System & Software
Analysis & Design, Design, Program, Code
SECADA, Windows/PPM Dev't
265 S. High St., West Chester, PA 19380
(215) 344-9933 FAX (215) 429-3562

DASI

8 Sirothmore Road
Melrose, MA 01750
Contract Services Throughout The U.S.
1-800-327-0434

Judge Technical Svcs

Serving New England & Mid Atlantic Immediate Opportunities
P.O. Box 1083, Salt Spring, PA 18084
Susan Luckow 215-677-7700;
FAX 215-687-6907

CONTRACTS IN: PA, NJ, & DE

DEVON CONSULTING

407 DEVON PARK DRIVE
ALBANY, NY 12208-2401
WATKINS, PA 19087-2401
215-244-3789 FAX: 215-244-7706

NACCB

"It was clear from the beginning that EDS' consulting approach was focused on improving our business performance. With EDS, we developed a business strategy that tripled our size while enhancing the scope and quality of our direct marketing services."

Tom Harrison, chairman and CEO, Neodata

"As we were conceptualizing on how to organize our business, EDS consultants were with us. Without the fully integrated support we received from EDS, I doubt we would be where we are today."

*John D. Costello, president,
Marine Spill Response Corporation*

"EDS provided an effective planning process. We have become a more customer-focused company."

*Larry Zalkin, executive vice president and CFO,
Westmoreland Coal*

"During a period of major change, EDS consultants helped us define our business priorities. Their focus on our business interests represented true partnership."

Brian Gaylord, president, Western Union Priority Service

"Utilizing EDS' integrated approach, we developed the first unified systems plan to support the business initiatives of GM throughout Europe."

Robhuart Dieck, executive director, GM European Information Management

These leaders all benefited from the same strategic decision.

To utilize the unique EDS approach that takes advantage of change and improves business performance. We help our customers set business objectives and strategy, streamline business processes and leverage resources, including information technology. To find out how you might benefit from the EDS approach, contact Mike Fischer, EDS, 7171 Forest Lane, M63, Dallas, TX 75230. Or call (214) 490-2000, ext. 163.

Consulting with

EDS

Changing Industry

Proving ground

The clock is ticking for vendors in the computer industry. Lip service will no longer be tolerated as customers lose patience with expensive licensing options, buggy software and service personnel who know less than they do. For vendors sporting the scars of '92, '93 will be a tough proving ground. *Computerworld* took a look at vendor challenges:

AMDahl Corp.

■ BIGGEST CHALLENGE

To cope with a recession-wracked economy that faces an oversupply of high-ion capacity and a lack of demand for large machines.

■ STRATEGY

Play up eight-way processor (which started shipping in October) against IBM's, which will ship in limited quantities this year.

■ PRODUCT ROLLOUTS

Unix processors based on Sun Microsystems, Inc.'s Scalable Processor Architecture (SPARC) chip. Cluster these SPARC-based machines and position them as application and file servers. Continue to enhance disk controllers to catch up with IBM's offerings.

■ OUTLOOK

"Once IBM makes its eight-way announcement in the first quarter, AMDahl will have a significant opportunity before IBM begins to ship its volume." — *Mark Hess, vice president, Gartner Group, Inc.*

Apple Computer, Inc.

■ BIGGEST CHALLENGE

To keep the Macintosh line competitive and affordable in an era of IBM PC clone price-slashing. Continue on

schedule with IBM/Motorola, etc. alliance to ship small volumes of PowerPC chip, the 681 RISC.

■ STRATEGIES

Continue shifting cost structure strategy from one of selling expensive machines with high profit margins to pushing high volumes of low-cost Macintoshes. Beef up high end with Macintosh server and reduced instruction set computing (RISC)-based Macintoshes.

■ PRODUCT ROLLOUTS

Small volumes of the 401 RISC low-cost processor (first quarter); Macintosh server (first half); RISC-based Macintosh (perhaps late in year).

■ OUTLOOK

"Apple is once again an intriguing company." — *Andrew Zimmern, partner, management consulting group, Coopers & Lybrand.*

Banyan Systems, Inc.

■ BIGGEST CHALLENGE

To improve market share and broaden product line.

■ STRATEGIES

Leverage large local-area network expertise into additional products by offering Enterprise Network Services (ENS) on competing LAN operating systems. Port Vines to other platforms, including Intel Corp.

based Unix, RISC and (possibly) Microsoft Corp.'s Windows NT.

■ PRODUCT ROLLOUTS

ENS for other platforms, including Microsoft's LAN Manager. New version of Vines, in which it hopes to merge the best features of Vines 4.1 and 5.0 into one product.

■ OUTLOOK

"Banyan's challenge is the next year will be to transform itself from a company focused on competing with Novell into one that supports the huge NetWare installed base as a market for its network services products." — *Janie Lewis, senior analyst, The Burton Group.*

BORLAND INTERNATIONAL, INC.

■ BIGGEST CHALLENGE

To get its suite of Windows applications, particularly its database, out the door in working order, and to keep pace with price cuts stemming from a software price war. The company also needs to seek closer ties with information systems through service and support.

■ STRATEGIES

Continue to press its technology-driven products as "best of breed," but take more care to hit delivery deadlines. Work to closely integrate Interbase database server engine with its other desktop products.

■ PRODUCT ROLLOUTS

Windows versions of dBase and Paradox. C++ compiler for OS/2.0.

■ OUTLOOK

"1993 is the year that Borland really recasts their business in a fundamental way. It's the first time they'll have to deal with real consultants on their database empire and think of their software portfolio as a total corporate offering." — *Ned Hill, senior software analyst, Forrester Research, Inc.*

COMPAQ COMPUTER CORP.

■ BIGGEST CHALLENGE

To continue to lure back corporate customers who deserted to lower priced clones during Compaq's high-margin heyday.

■ STRATEGIES

Continue to hold the clones at bay — price-wise and technologically — and push one-stop-shopping strategy. Diminish bloated product backlog, keep product cycles short.

■ PRODUCT ROLLOUTS

Full line of printers from new printing division. Pentium-based servers should arrive in the first quarter, with high-end four- to eight-processor multiprocessors in mid-'93. On the desktop side, expect refreshed ProLinea and DeskPro lines mid-year and new high-end desktops.

On the portable side, move i486-based notebooks are probable in the first quarter. New features such as wireless communications will likely appear in Compaq notebooks in the late second/early third quarters.

■ OUTLOOK

"They aren't out of the woods yet." — *Rimoldi Brown, former analyst, International Data Corp.*

COMPUTER ASSOCIATES INTERNATIONAL, INC.

■ BIGGEST CHALLENGE

To leverage existing mainframe software client base with expanded cache of PC software products, manage new licensing initiatives as customers look to distribute processing off a mainframe, and meet projection that PC revenue will equal mainframe revenue by mid-1990s.

■ STRATEGY

Expand presence in PC, Unix and application development markets while maintaining strength in mainframe software, which accounts for more than 70% of the company's annual revenue.

■ PRODUCT ROLLOUTS

CA-Unicoiter for Unix systems management packages for Hewlett-Packard Co. and Sun Microsystems, Inc. platforms. Aspen, an object-oriented, graphical user interface-based compiler for CA-Clipper, CA-DataFast and other iBase languages. Additional mainframe ports to Microsoft's Windows environment and IBM's OS/2.0.

■ OUTLOOK

"It's important for them to leverage their expertise and provide cross-

Forecast 1993

Changing Industry.

UP and COMERS

Continued from page 48
Intercommunications, Inc.,
Baltimore, Wash.

Interconnectix (an IBM Corp. subsidiary) bought back marketing rights to VMS for Hewlett, which it originally developed for Hewlett, Inc. Now debugged, updated and renamed *Language for Hewlett*, the product is getting a big response from companies that would like their database users to access VMS pre- and the service and vice versa—but don't want to buy a whole database system to do it.

Thomas Corp.,
Pittsburgh

Transact is on a roll on the distributed computing front, providing the foundation for a range of de facto industry standards. The company's *Enrich transaction-processing* member has already been adopted by IBM, HP, *HighData Systems Corp.*, *NEC Corp.* and *Siratus Computer, Inc.* as the basis for managing distributed transaction processing. Now, the Open Systems Foundation's *completing using Transact's* transactional RPC and has already begun to use the company's *Adaptive File System* for the management portion of the OSF's *Distributed Computing Environment*.

Watson Eng.,
Trenton, N.J.

This collaborative computing software supplier is starting to gain notice for *GroupSystems*, a set of software tools that

Continued on page 49

platform products for their mainframe clients into open systems areas such as Unix. — *Ed Arly, director of software research, Technology Investment Strategies Corp.*

DIGITAL EQUIPMENT CORP.

■ BIGGEST CHALLENGES

To stem losses and regain profitability: complete managerial restructuring and transition to streamlined organization; market Alpha 64-bit RISC-based systems on Open VMS, Microsoft's Windows NT and Open Software Foundation's OS/1; and push into commercial Unix and follow up on strong (but very tardy) start in PC areas.

■ STRATEGIES

Get a jump on other open systems vendors by taking advantage of high-performance 64-bit Alpha technology on Windows NT, OS/1 and Open VMS. Cut hardware costs and prodigious time through modular manufacturing. Combine hardware and network applications support software in system integration business. Institute commission-based sales and greater use of indirect channels.

■ PRODUCT ROLLOUTS

New version of OS/1 targeting commercial users. Mips Technologies, Inc.- and Alpha-based systems running OS/1. Software to support Alpha, More Alpha-based PCs and Open VMS platforms. Continued price cuts, release of traditional VAXs.

■ OUTLOOK

"They have to pull off the Alpha transition but at the same time find markets where they will grow. Unless you generate revenue, you have to keep cutting costs." — *Bill Bluestein, senior analyst, Research Research.*

HEWLETT-PACKARD CO.

■ BIGGEST CHALLENGES

To capture Digital Equipment Corp.'s long-held position as second-largest computer vendor in the U.S.; manage smooth transition under new chief executive officer; sell more effectively to accounts that plan to downsize to multiuser computers; promote Unix without threatening MPE accounts; deliver on "Open MPE" promise; and improve PC sales and presence.

■ STRATEGIES

Continue all-out effort to replace

boots with its high-end minicomputers, making it easier to sell workstations, PCs and printers. Continue upgrading HP/UX and Precision Architecture-RISC (PA-RISC) to stay ahead in that arena.

■ PRODUCT ROLLOUTS

High-speed workstations based on 100-MHz versions of PA-RISC.

■ OUTLOOK

HP's workstation business will turn more profitable now that users have almost completely made the transition to HP's RISC. HP will sell more Unix systems than proprietary MPE versions. As for a potential threat from IBM's Unix multiuser business, "IBM's vacuum is a large one." — *Robert Herwick, analyst, Hambrick & Quist, Inc.*

IBM

■ BIGGEST CHALLENGE

To capitalize on reorganization plan put into effect last year.

■ STRATEGIES

Two customers more effectively with its more autonomous lines of business, especially in the PC area, where it's taking a beating on margins because of low-end price wars. Continue to build momentum with OS/2. Deepen RISC System/6000 penetration in commercial sites.

■ PRODUCT ROLLOUTS

High-end, eight-way processor will take advantage of data center consolidation. Expected to unveil a system common to both OS/2 and AIX platforms.

■ OUTLOOK

"I'm looking for modest revenue growth on the order of 2% to 4%. They have to attract new orders and maintain the existing revenue stream on both the high end and low end." — *Philip Reppert, analyst, Sanford C. Bernstein.*

KNOWLEDGEWARE, INC.

■ BIGGEST CHALLENGE

To refocus on improving existing products rather than branching out to new areas.

■ STRATEGIES

Proselytize for IBM's A/Cycle. Ramp up consulting services.

■ PRODUCT ROLLOUTS

LAN-based repository co-built with IBM. Existing tools tweaked to talk to Unix.

■ OUTLOOK

"We struggled with some modules released too early but KnowledgeWare is working with us well." — *Ray Speight, systems development manager, North Carolina Department of Administration in Raleigh.*

LEGENT CORP.

■ BIGGEST CHALLENGES

To migrate products and service to LANs and desktops and streamline Goal Systems International, Inc., acquired last year.

■ STRATEGIES

Establish a major position in systems management products for heterogeneous environments. Migrate mainframe products to client-server architecture that lets end-user desktop functions interface with mainframes, departmental servers.

■ PRODUCT ROLLOUTS

XCOM/SIS, a software distribution system. A disk backup product for distributed environments. Unix versions of Endeavor software management tools. Data Center Workbench, which will allow users to combine, display and analyze output from other Legent mainframe and network management products.

■ OUTLOOK

"About 20% of their revenues come from non-MVS sources, but they need to move that up as quickly as possible to 40% to 50%. That will take about two years." — *Charles Phillips, vice president, SoundView Financial Group, Inc.*

LOTUS DEVELOPMENT CORP.

■ BIGGEST CHALLENGES

To exploit workgroup computing lead by competing Notes sales; combat fierce competition in spreadsheet market and convince users it can lead to spreadsheet innovations.

■ STRATEGIES

Evolve from provider of personal productivity tools to organizational productivity tools. Reposition itself as a "communications-centric" firm that offers network tools as well as mail-enabled applications.

■ PRODUCT ROLLOUTS

Notes Version 3 (expected in early '93) with Apple Macintosh support, a text-and-retrieval engine from Verity, Inc. and improvements to its replication technology. Initial Unix support for Notes, starting with Sun Microsystems Solaris and IBM AIX

operating systems, later in 1993. 1-3 for Windows Release 2, in early 1993, which will include the initial workgroup technology Chronicle.

■ OUTLOOK

"Lotus has a two-year lead and a powerful story in Notes and mail-enabled applications. But spreadsheet [account for] over 50% of its revenues. Any sharp disruption in this operation will have serious consequences on its business overall." — *Will Fautle, vice president, PC Strategy analyst, Alex. Brown and Sons, Inc.*

MICROFOCUS, INC.

■ BIGGEST CHALLENGE

To maintain huge success with Cobol (It owns nearly 80% of PC-based Cobol development market) in face of end-user programming and movement toward C++.

■ STRATEGIES

Emphasize the ability of its tools to bring mainframe Cobol development environments to PCs and Unix workstations. Continue rebranding public profile by moving away from private-labeling its compilers to other vendors (notably, IBM and HP). Expand leadership on ANSI Open-Source Cobol committee and efforts to alter experimental versions of COBOL to customers.

■ PRODUCT ROLLOUTS

Continue to introduce products that migrate all aspects of Cobol development to smaller platforms. Introduce preliminary version of COBOL after ANSI committee releases draft recommendation in April.

■ OUTLOOK

"They're positioning Cobol as a client/server tool. That's a little [tough]. They will play a bit that market, but it's not the cash cow Cobol for Unix. They have the programers' ears, they know what's real and what's fake. They can't lose." — *Andrew Mahon, senior analyst, New Science Associates, Inc.*

MICROSOFT CORP.

■ BIGGEST CHALLENGES

To gain acceptance with customers as a credible enterprise system software vendor and get Windows NT into big firms before OS/2 2.0 locks the doors.

■ STRATEGIES

Increase customer service to attract and keep big corporations. Work with value-added resellers, OEMs and consultants to strengthen

Changing Industry

as areas of weakness, such as networking and virtual markets. Make applications more network- and workgroup-enabled with advent of Windows NT and increased presence of Windows for Workgroups.

PRODUCT ROLLOUTS

Windows NT and LAN Manager for Windows NT both in early 1993.

OUTLOOK

"The sole threat to [Microsoft's] success in what they are trying to proceed on so many critical fronts simultaneously, even as a \$2.5 billion software company... they have to decide what their core competencies are and focus on those. At any point, they need to recognize they need to be a software product's company." —*Neil Hill, senior software analyst, Forrester Research.*

NCR CORP. AT&T'S NETWORKED COMPUTING RESOURCE

BIGGEST CHALLENGE

To convince a cautious market that a massively parallel processing architecture is a viable solution for commercial applications.

STRATEGIES

Continue to leverage its talents and products with those of AT&T. AT&T Bell Laboratories and parallel processing leader Teradata Corp.

PRODUCT ROLLOUTS

The System 3700, a massively parallel processor platform developed jointly with Teradata. Optimized refinements and customer sales of Cooperation. Its 50-processor software environment for distributed client/server computing. More notebook and pen-based systems and further integration with its wireless LAN product, WaveLAN. Multimedia systems using voice and data.

OUTLOOK

"The marriage [between AT&T and NCR] has taken place. It's been consummated and you're going to love the kids." —*George E. Lindemeyer, vice president and director, high performance computing, Gartner Group.*

NOVELL, INC.

BIGGEST CHALLENGE

To move NetWare from its current department/workgroup LAN base to a mission-critical corporate platform for the Fortune 1,000.

STRATEGIES

Form alliances with companies

(such as IBM and HP) that are already well-established in corporate accounts. Beef up NetWare and work with third parties to fulfill corporate needs. Improve NetWare/Unix integration and establish Unit as a corporate productivity platform through Univ. Novel's joint venture with Unix Systems Laboratories, Inc.

PRODUCT ROLLOUTS

NetWare 4.0, a major change in architecture from the previous version that is aimed squarely at the corporate market scheduled for release in first-quarter '93, with enhancements to be added throughout the year. Upgrades to Network Management Services, NetWare for SAA and NetWare Global Messaging.

OUTLOOK

"The phenomenal growth of LANs will flatten over the next five years, so Novell must extend its business into other areas, move users to more sophisticated products and broaden their product base to include routing, hubs and network management products." —*Susan Prindiv, LAN analyst, International Data Corp.*

ORACLE CORP.

BIGGEST CHALLENGE

To make new Oracle 7 relational database a technical and commercial success.

STRATEGIES

Prevent erosion in its installed base — the largest installed base for any independent relational database management system supplier — while creating new opportunities. Use new business-development unit to promote new niches for database use in telecommunications and electronic publishing.

PRODUCT ROLLOUTS

Oracle 7 relational database for distributed database applications. SQLForms application development tool. SQLNet networking software to link multiple Oracle databases. Computer-aided software engineering tools and Oracle Financials and Manufacturing application suites.

OUTLOOK

"Until Oracle 7 is proven to be industrial strength, people may not be willing to migrate their applications to it. Oracle's other challenge is retaining their best and brightest developers as they grow into a major systems vendor with more than \$1 billion in sales." —*Michael Corry, president, International Oracle User Group and vice president, Database Technologies, Inc.*

SUN MICROSYSTEMS, INC.

BIGGEST CHALLENGES

To manage user transition to Solaris 2.1 and new hardware lines based on Texas Instruments, Inc.'s SuperSPARC Viking chip; introduce true symmetric multiprocessing (in Solaris 2.1) for large-scale commercial applications; and fight off anticipated competition from high-end PCs based on Intel Corp.'s P5 chip.

STRATEGIES

Ramp up commercial push with high-end multiprocessing servers. Hold onto leading market position with high-volume, low-end workstations based on TI's Tinsmith SPARC processor.

PRODUCT ROLLOUTS

New operating system (Solaris 2.1) and new hardware such as SPARC-Classic class workstations, high-end SPARC-Center 2000 servers.

OUTLOOK

"If Sun continues to follow the same management philosophy about open competing and gives good deals to the marketplace, they can't help but be successful. They realize they're dealing with a customer community that's a lot more intelligent on what we're looking for." —*Roy Canbin, senior vice president of wholesale services, Operations and systems, Wells Fargo Bank.*

SYMANTEC CORP.

BIGGEST CHALLENGES

To overcome huge revenue loss in '92, spurred by sudden downturn in DOS software market; make good use of recent purchases, including object-oriented language vendor The Whitewater Group and Multiscope, a seller-of program debuggers; and continue legal battle with

rival Borland over hiring of Borland executive Eugene Wang.

STRATEGIES

Continue to maintain and focus interest in development tools and utility programs. Revivify QAA database program (the company's first product) by introducing Apple Macintosh and Microsoft's Windows versions. Press the release of tools supporting cross-platform development of DOS, Macintosh and Unix.

PRODUCT ROLLOUTS

Upgrades of products, along with new releases for Microsoft's Windows NT. Cross-platform development library "Bedrock," which may also be distributed by Apple.

OUTLOOK

"They made a few mistakes [in '92] and came up short. I want to see them demonstrate the competence to deliver new products." —*Thomas J. Erickson, partner, Watson, Arnold & Henderson.*

WANG LABORATORIES, INC.

BIGGEST CHALLENGE

To overcome bankruptcy stigma and remake itself from minicomputer maker to a software/services company.

STRATEGY

Exploit Office 2000, an office-automation scheme anchored by Wang Imaging software and IBM's RS/6000.

PRODUCT ROLLOUT

Unix-based Imaging software.

OUTLOOK

"We just don't know what we're going to do. Unix is interesting but so are local-area networks." —*Jag Jorgel, Boardman Newman Cardew, IS director, National Bank of Interior Commerce in Mexico.*

UP and COMERS

Continued from page 68 provides "anytime, anywhere" electronic meetings and support, for teams. IBM has been meeting its GroupSystems product as TeamFocus for OS/2 and now has about 90 customers.

Watt Systems, Inc. Austin, TX

Watt is tapping into the need for client/server application development tools with its Gateway environment, which analysts consider to be the first true client-server application builder. It is a platform and operating system-independent and was designed specifically for creating large-scale commercial applications.

Peoplesoft, Walnut Creek, Calif.

The 5-year-old provider of human resource and financial packages did about \$25 million worth of business in its fiscal year, reportedly up 50% from last year. Peoplesoft is making life difficult for the likes of Sun & Bradstreet Software, The Dodge Group, Computer Associates International, Inc., Tesseract and Integral.

If we knew the key to flourishing in '93, we'd be rich. But there are clues, such as HP's attention to open systems, IBM's bid to get closer to its customers and its admission that it can't continue serving all its traditional markets. The end of '93 should see new faces on older companies; the alternative means not surviving to the end of the decade.

WE HAVE LAURELS AT TOSHIBA, WE JUST DON'T

Level 1: 1600
 Level 2: 2500
 Level 3: 5000
 Level 4: 7500
 Level 5: 10000
 Level 6: 12000
 Memory levels
 Level 1: 1600
 Level 2: 2500
 Level 3: 5000
 Level 4: 7500
 Level 5: 10000
 Level 6: 12000
 Weekly

Interway Point Update

Subsequence	Points	Binary	Points	Rank
A	7080	#3	480	4
B	1288	#1	1218	10

PRESENTING THE T44

REST ON THEM.



The PC Magazine's Editors' Choice Award is just one of the many awards our highly acclaimed T4400SXC has captured.



The new T4400C is available with a blazing 25 MHz 486DX processor.



With our T4400C, you have a choice of either a 200MB or 120MB hard drive.



Our T4400 series features our MaxTime power management system that gets the maximum out of every battery charge.

Immediately after capturing the "Editors' Choice" award from PC Magazine for our T4400SXC, we asked our engineers to better it.

They responded with the T4400C. A notebook that redefines what is possible in 486 color technology.

Take for example its TFTLCD active matrix color screen. We pioneered this technology and now we've advanced it even further by enlarging the screen to a full 9.5 inches. Amazingly, it provides an eyeball-popping 256 simultaneous colors at 640 x 480 resolution from a palette of 185,193 colors, making it the best TFT color display on the market.

If you think that's impressive, check what's under the hood. You'll find a choice of either a blistering new 25 MHz 486DX processor with a massive 200MB hard drive or the renowned 25 MHz 486SX with a 120MB hard drive. And both offer 4MB RAM expandable to 20MB.

Of course, if your needs are more modest, we offer a T4400SX with a large 9.5" monochrome LCD screen, a not-so-modest 25 MHz 486SX microprocessor and 120MB hard drive.

Our engineers even extended battery life. By offering such MaxTime™ power management features as automatic display and hard drive shut down, AutoResume and AutoSave.

To test-drive the T4400C yourself, feel free to call the number below for the location of your nearest Toshiba dealer.

Our operators don't like resting either.

In Touch With Tomorrow.

TOSHIBA

1-800-457-7777

1992: The poem

I think a minute here's well spent,
Looking at the year just went
And paying tribute most becoming
To they who kept our keyboards humming.

IBM bids terabyte adieu
To God-awful YE;
It's bad, that's true, but all this pales
To a future without mainframe sales.

Or at DEC, Bob Palmer's hip
To find someone to buy his chip,
But in the meantime, let's face facts—
No one wants to buy a VAX.

Price cutting was in the air,
As vendors vied for market share;
Can it be long before we pocket
A Compaq in the supermarket?

Client/server's real hot,
And it's a snap to get there—NOT!
The products there are really great,
Cepit most still can't communicate.

Software firms trace hurts' tummy
To jobs of low-cost auto sale yummies;
Users snapped up deals galore,
While margins went right through the floor.

Borland's own Activision' hood
Appears to be in lock and foot;
And database is only a mess,
Since 80 backends buy Access.

Microsoft, on t'other hand,
Hopes NT's gonna beat the band;
But Unix won't yet say farewell—
It's got a new friend named Novell.

CA launched a pricing play
To keep its user base at bay;
But CA's license recompense
is still made up in maintenance.

CIOs still run for cover
When EDS begins to hover
Around their bosses' office doors,
Whispering that dreaded word: "Outsource."

Kohler, John and Charlie Field
Quit CHD jobs they once held;
But never fear, they'll have low wages
In new careers as one-off-hires.

Hey, don't you worry, please don't whine,
Cause '92 will be just fine;
Recession's easing, worst is past,
And '92 is gone—at last!



Paul Gilkin, Executive editor



Safe and secure?

Your publication had an article on toll fraud and one that was bullish on wireless on the same page [Enterprise Networking, CW, Dec. 7]. Interesting combination.

In the first, you advise us to use all the PBX security features, limit calling permissions and so on. In the second, you say that users prefer wireless in most situations and that the distinction between wireline and wireless will soon disappear.

I wonder if you know how incredibly easy it is to monitor all wireless transmissions. A scanner can easily be used to pick up transmissions regardless of the mode used. And with a high-speed computer, recorded transmissions can easily be dissected to yield login identifications, passwords, encryption techniques and so on.

Security has one thing going for it: You can't look into my phone wires. Put it all on wireless, and I predict a level of toll fraud and other backing practices the likes of which we've yet to see.

I trust that those who are implementing the whole wireless computer or picture will be extremely diligent when the security issues arise.

George A. Leach Jr.
Staten Island, N.Y.

Some things never change

In the commentary "A winning client/server formula" [CW, Dec. 7], the columnist states that using senior developers plus developing from scratch is the winning formula. This is an old formula dressed up in the new clothes of PC-based devel-

opment. When will management methods ever change? For 20 years now I've heard the argument: "Use your best and most senior programmers/developers."

The author is certainly on the first not regrettably the last to offer such advice. What do these consultants advise for how we should use everyone else? How else do junior people become seniors? What kind of advice is this?

Gregory H. Boone
Bellingham, Wash.

Holding the key

Your article "Encrypted data at risk" [CW, Dec. 14] raises interesting issues about the strength of the DES and RC4 encryption algorithms. A 65-66 line space is relatively easy to search because it only contains about one trillion keys. What if, as I say in Stephen Wolfram's *Mathematics with a Computer* (with 100 computer-generated pictures), we use a random key stream?

DES and RC4 use mathematical algorithms designed such as DES. They treat the message as a sequence of bits and use the same key stream to encrypt and decrypt. A random key stream, on the other hand, is a sequence of random bits. Computers about the size of a desktop can generate a random key stream of the "All Japan Oil" sort in the middle of the article might suggest.

Burton E. Kestel Jr.
Bakersfield, Calif.

Missing the point

Your front-page article "Some users are wary of encrypted software keys" [CW, Nov. 30] overlooks some

important implications of the software vendors' practices.

The term "encrypted keys" is a euphemism. What we are really talking about is copy protection. Many of the problems that made copy protection a failure in PC software also exist on the mainframe.

Codes that restrict which CPU the software can run on prevent a serious problem for disaster recovery: If you have to move your operating to a backup site or a recovery center, you must get a patch from the vendor to allow the copy-protected programs to run.

Some software vendors will provide a key in advance for a backup system, but with a commercial recovery-center contract, you could be switched to a different CPU at the time of a disaster.

The article also mentions keys that contain an expiration date. Most software licenses are perpetual. If you paid for a perpetual license but the software contains an expiration date, you are not getting what you contracted for.

You quote unnamed vendors as saying that it is impossible for the keys to be used to shut down the software. That's ridiculous. Their very purpose is to shut down the software if a customer tries to use it in a way the vendor does not approve of.

Robert J. Sandler
Wayne, N.J.

IF COMPUTERWORLD WILL CONSIDER COMMENTS FROM ITS READERS, LETTERS MAY BE EDITED FOR BREVITY AND CLARITY AND SHOULD BE ADDRESSED TO BILL LABERS, EDITOR IN CHIEF, COMPUTERWORLD, P.O. Box 9173, 375 COHNWATER ROAD, FRAMINGHAM, MASS. 01701. FAX NUMBER: (508) 875-8931; MC MAIL: COMPUTERWORLD. PLEASE INCLUDE A PHONE NUMBER FOR VERIFICATION.

Mountain

Our DAT drive family was designed to meet everyone's needs...



Now at a new low price!

Mountain's full line of 4mm DAT products including the new high capacity, high performance FileSafe® 1200-4 and FileSafe 1200-4 Dual tape backup systems, were designed to meet the needs of your growing data management requirements. Now with prices starting at \$2,495*.

The FileSafe 1200 product family offers storage capacities from 2 to 8 gigabytes, Quick File Access for rapid file retrieval, and advanced error checking and correction techniques designed to ensure the highest possible data integrity and reliability.

Our award-winning FileSafe tape backup software is included. It provides an easy to use solution to your unique backup requirements whether you are using DOS or major LAN operating

systems, including Novell® NetWare® and Artisoft™ LANtastic®. Mountain FileSafe 1200 subsystems are also compatible with UNIX. And, of course, Mountain's 15 year reputation for quality, service, and support provides you with the protection you have come to expect.

To find out more about our DAT product line, or for a reseller near you, call Mountain at 1-800-241-3937 Dept. D, or fax us at 408-379-4302.



Mountain.

***Manufacturer's Suggested Retail Price**

Mountain, the Mountain Network Solutions logo, and FileSafe are registered trademarks of Mountain Network Solutions, Inc. All other product names are trademarks of their respective owners.
Mountain Network Solutions, Inc. (408) 379-4300

Charles Babcock

Software tar pits

Not since Frederick Brooks wrote *The Mythical Man Month* in 1975 has there been so much gnashing of teeth over the software business.

Brooks compared software development to a tar pit—an analogy that still fits—and concluded that no matter how you blunder into it, you will only get further enmeshed by your struggles.

Much of what he said might apply to Oracle, Microsoft, Borland or any number of other candidates. Running any software company today is fraught with difficulties, but PC software companies have a particularly tough task.

Part of the difficulty is that software is a constantly changing product rather than a discrete one like a screw bolt. Development engineers want to squeeze more functionality into the latest release; marketing wants to launch the product campaign and curtail development; and the sales force wants a flashier user interface.

Brooks concluded that the numerous translations a concept undergoes on the way to becoming a software system each carry risks of failure. Ideas expressed in English must be transformed into specifications, flow charts and designs, which in turn must be converted into a programming language and machine code. When the project falters, management typically throws more programmers at the task.

Today's software companies, particularly PC software companies, have found ways to advance the hen. Often, the financial people are talking expense reduction while the engineers are talking more research and development; technical support is talking greater ease of use; and the sales force is asking why the engineers won't deliver something they can sell.

Meanwhile, development costs have doubled or tripled for firms that serve more than one platform.

Moreover, PC software companies today must constantly revise their projection of who the PC user is. The profile has proceeded down the curve toward a user who is less technically skilled but who has high expectations of functionality and changing design requirements, points out Stephen Kahn, senior vice president of products at Borland.

The tension between supporting the existing product line vs. creating a new one is especially acute in the PC sector. The mainframe and minicomputer software suppliers charged for support. The PC market has become accustomed to free support and pays modest \$60 or \$80 a charge for upgrades.

Given the potential customer base, there

is ample opportunity in desktop software, but a PC software company must still juggle a set of conflicting tensions to come out at the right place. A PC user is less understanding than his large system counterpart when the supplier fails to deliver a product on time.

Large system users were frequently engaged in software development and were familiar with the temptations to fall behind schedule. They also knew that a vendor focused only on the schedule might be offer-

ing them a bug-riddled product.

And when something came out unexpectedly ahead of schedule, large system users ran for cover on the grounds that the supplier was most likely looking to customers to help pay testing expenses.

Ambitious PC software firms must cope with different expectations and a different level of competition. Many live in fear of a competitor's stealing a march on them.

Given the inherent ambivalence, software companies need as many no-nonsense, rigorous business thinkers who can

execute plans and schedules as they can flail. But by nature they attract more than their share of brilliant dreamers, schemers, would-be artists and tinklers.

The best results may stem from the lone, inspired individual or small, flexible team, but someone has to keep an eye on the path. Too many missteps still lead straight to the tar pit.

Babcock is *Computerworld's* technical editor.

OF COURSE
YOU HATE PROJECT
MANAGEMENT SOFTWARE.
MOST OF IT IS
DESIGNED BY PEOPLE
WHO HAVE NO IDEA
WHAT IT'S LIKE TO DO
YOUR JOB.

Project management software seems to have one fundamental flaw: the people who design it usually aren't project managers. So they don't think the way you do. They give you functions you don't need or they oversimplify your job with products that soon become obsolete.

At AST, we are project managers. Which is why we've designed a way to work based on a familiar way of thinking: yours. 1-800-4-PROJEC. Call us when you're good and mad.

THE MOST EFFECTIVE MANAGEMENT OF PROJECT MANAGER

APPLIED BUSINESS TECHNOLOGY

Now Windows is as easy to use as DOS.

Microsoft's Windows[®] is capable of great and wonderful things.

But if you're among the many who've traded the frustration of the C: prompt for the graphical confusion of Program Manager, relax.

You're about to discover what half a million delighted DOS[®] and network users already know.

That the shortest distance between you and your programs is straight through Direct Access[™].

It's the world's best-selling menuing software. And as soon as you install it you'll understand why.

Direct Access searches your disk, gathers your programs into logical groups and builds menu screens just like the one you passed a couple of paragraphs ago.

All by itself.

That's right. You just load it and forget it.

Whenever you want an application, all you have to do is hit one key.

Or, if you prefer,

you a multitude of utterly sensible program groupings—17 of them.

And that doesn't count the customized ones you dream up yourself.

What does all this mean to you?



Direct Access searches your hard disk, groups your applications logically and generates menus and submenus automatically. All you have to do is point and click.

It means you can get to a spreadsheet by simply clicking "Spreadsheet." Summon a word processor by stroking "W." And access a DBMS by selecting, you guessed it, "Database."

You can even park your favorite programs right on the main menu and ask for them by name.

Hey, we didn't call it Direct Access for nothing.

If the only PC you're responsible for is the one on your desk, Direct Access is valuable, indeed.

But if you're responsible for a department full of PCs, Direct Access is priceless.

Suddenly all of your Windows and DOS users can follow the same quick, convenient route to their applications.

And if all those PCs are networked, so much the better. Because you can install—and customize—Direct Access on everybody's workstation without leaving yours.

You can decide for yourself precisely who gets access to which menu items.

And prevent novice users from even looking at DOS.

There's more. A lot more. So pick up the phone. Dial 1-800-926-4289, Ext. 55.

We'll tell you about our one-year money-back guarantee and our vaunted toll-free customer support.

Which you can access directly, 24 hours a day.



click one mouse.

The more applications you have on your disk, the more you'll delight in Direct Access.

That's because Program Manager insists on grouping your programs into five arbitrary categories: "Windows Applications," "Non-Windows Applications," "Accessories," "Games" and "Main."

Not very intuitive, eh?

Direct Access, on the other hand, gives



FIFTH GENERATION SYSTEMS, INC.

Desktop Computing

Q&A WITH
MICHAEL DELL, 78
VIRUS WATCH, 79
NEW PRODUCTS, 83

Paul Gillin

Don't be fooled by hype of multimedia



Imagine being able to watch Peter Jennings in a window on your PC screen, videoconference with your friends, attach moving pictures of yourself to your documents and integrate newsfeeds into your memos.

It's multimedia, the future of computing, the toast of Comdex, the peak killer app, the holy grail that's going to transform us from a nation of media-savvy desk jockeys into wizards of media-empowered communications.

Not. Multimedia may be a big deal someday, but it's not an explosive market, a paradigm shift or something that should make you send your application developers back to the drawing board.

It is, however, a straw of hope for a vendor community that's seen its hardware marketplace disintegrate into a bloody price war and the mainstream software market devolve into one-shipment-over-features that nobody uses. Vendors absolutely love multimedia. And why not? Multimedia requires state-of-the-art processors, scads of storage, fat network bandwidths with which to transmit all this stuff and pricey accessories such as video cameras and \$1,500 add-in boards. What's not to love?

The problem is, multimedia is about as important as mouse pads on the list of pressing corporate buying concerns. That's because the promise of multimedia is materially impact produc-

tivity or give anyone but video producers a competitive advantage in highly suspect. It's certainly not yet worth the structural investment users will have to make.

Consider this: If you want to multimedia-empower a single user, you will have to buy roughly \$5,000 worth of equipment. That includes a 486 PC with at least 640 bytes of memory, about a half-gigabyte of disk space, graphical user interface software, video and sound boards, speakers and a camera or scanner.

If you want to network this user (and what good is stand-alone multimedia, except as a demo tool?), multiply that by the number of users you've got and then triple it to take into account a server cabinet and the time required to install and test all that stuff and train people on it.

So now what have you got? A user who can send a picture of himself to other people on the network (now that's strategic!) or attach a voice annotation to a memo. (You can do that with voice mail for one-tenth of the cost.)

Flashers of practical utility

Yes, there are practical uses for multimedia, and yes, it will play a role, perhaps a major one in the future. You can see why a claims adjuster would like to capture photos of a damaged car and incorporate them into an accident report. And there are some great applications emerging in the real estate business that let shoppers take a virtual tour of available properties without having to go in.

In the future, multimedia has tremendous potential to link people virtually across long distances, cut travel costs and create the virtual workplace.

But there are too many standards battles to be resolved first. The communications infrastructure needs to be vastly improved. Fifty million desktop computers need to be upgraded or replaced. And millions of users will have to overcome their aversion to making videos of themselves.

No, for now, at least, multimedia is a marketing concept designed to extract big money from you for little benefit. Don't be fooled by it.

Gillin is Computerworld's executive editor.

Software Publishing heats up Windows database battle with Superbase 2.0 debut

By Christopher Lindquist

The recent addition of Microsoft Corp.'s Access to the Windows database market has changed the landscape considerably. But Software Publishing Corp., an early entrant into the Windows database market, is not ready to concede yet.

Software Publishing recently announced

the shipment of Superbase 2.0, the latest version of its Windows-based database development package. And while Software Publishing Chief Executive Officer Fred Gibbons said his company cannot compete in a price war with Microsoft, it can compete by providing superior tools. "Superbase is not a 900 product," Gibbons said, refer-

ring to Microsoft's promotional pricing for Access. He said Superbase is aimed at professional developers who need to develop serious databases.

Enhancements

As a result, the new Superbase includes several improvements, including a new Windows-compatible user interface, enhanced graphical design tools,

extensions to the Super Basic Language and better connectivity.

The first thing beta-test users said they were impressed with was the improved user interface. "Some of their conventions (in previous releases) were a little weird, to say the least," said an information systems analyst at a large oil

Superbase, page 79

Upgrades in abundance at this week's Macworld

By James Daly
SAN FRANCISCO

More than 50,000 Apple Computer, Inc. Macintosh models are expected to gather at the biannual Macworld Expo/Sea. Francisco this week to

sample the latest and greatest wares of more than 500 hardware and software vendors.

Apple is expected to announce a newly refreshed printer line on Wednesday during the first morning of the four-day gathering. However, the remainder of the show is expected to yield little in the way of breakthrough technological introductions or new applications. Instead, many third-party companies will be showcasing newly revised versions of existing products.

In the kickoff keynote, Apple Executive Vice President John Dierly will take the wraps off a 600- and 300-dot/in. Laserwriter, a color Inkjet printer, a new Stylizer using bubble-jet technology and a color scanner.

A look ahead

The following weekend, Senior Vice President Roger Hennes will discuss Apple's plans for future operating system add-ons — ranging from QuickTime multimedia improvements to new toolboxes and network enhancements — as well as the company's plan to sell them separately to users who are interested in customizing their systems.

The integrated packages market will get a boost when WordPerfect Corp. rolls out WordPerfect Works 1.2 for Macintosh. The package is a revamped version of BestWorks 1.0.1, which WordPerfect acquired in October from software maker BestWorks, Inc.

The \$249 WordPerfect Works will feature six modules: word processor, database, draw, paint, communications and spreadsheet with charting. The application will also include in-content editing, which allows users to edit material linked from documents that were created in another module.

No Hands Software in Palo Alto,

Calif., is slated to announce Cannon Ground, a software program designed to give users access to a wide range of electronic documents. It will use the company's DigitalPaper technology, a new cross-platform file format that is built into the applications.

A company spokesperson said that DigitalPaper-based programs may include executable code that makes them "self-launching," which means that in order to view a document, the user need not have purchased DigitalPaper-based software from No Hands.

No Hands plans to ship Cannon Ground 1.0 this month. A version for the Macintosh

Corp. Windows platform will be available later this year.

New hard drive

SyQuest Technology in Fremont, Calif., will announce the SyQuest SQ2510, its first 84M-byte removable hard drive with the ability to read and write to either 44M- or 84M-byte SyQuest cartridges. Until now, SyQuest's original 84M-byte hard drive, the SQ510, was "equipped to read data only from a 44M-byte cartridge. The SQ2510 is expected to be available for approximately \$600.

Enviro, Inc., a St. Paul, Minn.-based provider of video presentation and storage products, will introduce SmartStack, a modular storage system and Small Computer Systems Interface (SCSI) equivalent system that automatically connects multiple hard drives using only one SCSI and power cable. Prices start at \$999.

Two vendors also plan to demonstrate upgrades to their graphics packages. Fractal Design Corp. will exhibit a major revision of Painter, its natural-media graphics package.

The Aldus Corp. consumer division, formerly Silicon Beach Software, Inc., will show SuperPaint 3.5, an update that makes the program System 7 savvy and offers a new color or clarity filter. Aldus is also adding templates for notes, brochures and fax cover sheets.

Dell's formula defies rules in competitive PC market

Michael S. Dell, 27, has come a long way in the eight years since he became a dormitory room entrepreneur of legendary proportions at the University of Texas. The journey has included flirtation with bankruptcy when his company was still known as PCs Limited, spitting wars with cross-Texas rival Compaq Computer Corp. and a track record that managers using years his senior would envy. While no company can continue triple-digit growth rates unabated, Dell's company continues to race along. He spoke recently with Computerworld senior writer Michael Fitzgerald.

Q: As Dell has moved into the first tier of vendors, how has the company changed?
A: Our strategy, while it has evolved, hasn't changed that much. We still want to service customers and run an efficient operation. I think a lot of people underestimate the strength of our channel and the power of our business model. We talk to customers every single day, vs. somebody whose biggest customer is an intelligent Electronics or JWP. We had 14% growth in

the U.S. market in the third quarter, so it's pretty obvious we're doing something right.

Q: How is what you do so different from other direct sales companies?

A: It's not hard to imitate pieces of it, but to duplicate our entire process is much harder than it looks, and I don't think anyone's done it. When you look at our market, people have made runs at us—two years ago it was Northgate, last year it was Zens, this year it's Gateway—and they've followed the same pattern. Growth has shot up, then flattened and then gone down. Now, Gateway hasn't started going down, but they have flattened.

The difference is around the system and product side of the business. We have a significant investment in product development.

Q: Now that you're in the top tier of vendors, how do you keep the hunger from waning?
A: I don't think you'll see any signs of hunger disappearing here. We still view ourselves as David fighting Goliath. We're still the hunter, even though we too are being hunted. We see it as eight down, two to go

[in terms of larger PC companies].

Q: One knock against Dell's success has been that you don't sell well into corporate accounts. How much of your growth is coming from there?

A: It's just not true that we don't sell to large accounts. Half our sales for the last three to four years have been to corporate accounts.

If you look at our business today, our fastest growing area is large accounts, meaning the Fortune 500 and government. That grew at 175% on a year-to-year basis in the last quarter, and that's the first time it's been our fastest growing area.

Q: How is it that you survived and even thrived in the face of the low-end attack of Compaq and later IBM, which many thought would damage you?

A: The world is not IBM and Compaq and Dell. Together, we make up only 35% of the PC market. If you launch a missile at the market, you'll wipe out a lot of companies before you wipe out Dell.

Q: Your company operates on a lean return

on investment of about 5% as part of its business model. How do you keep investors from demanding higher short-term profits?
A: We could earn 8% or 9% in a quarter for a couple of quarters, but that would leave such an umbrella for us in the market for competition to come in. So what we've done is to articulate a strategy and say to investors, "Look, this how we run our business; you either like it or you don't."



Michael Dell: "The world is not IBM and Compaq and Dell."

Q: Well, certainly you didn't seem that calm in the wake of this Rap over your currency trading in the second quarter.

A: I view it as a pretty serious matter when somebody [implies] we broke [Generally Accepted Accounting Principles]. That's a very damaging statement, and when it's not true I don't know how else to react to it. How would you feel if I came out and said your newspaper prints lies?

Q: What do you see as your biggest challenge in the marketplace in 1993?
A: To continue executing our plan [rather] than necessarily reacting to the market.

What can you do after making the world's best performing workstations? Do it again.

When you're hot, you're hot. And our new generation of HP Apollo 9000 Series 700 workstations sizzles. With performance far ahead of anything else on this or any other known planet. But at extremely down-to-earth prices.

Our new generation PA-RISC is the catalyst for the latest advances. Providing a color entry-level system with phenomenal performance for just \$5,695. 3D graphics available across the entire product line, even the low end. And a breathtaking 147 SPECmarks at the high end.

Think for a moment what all this could do for you. Then don't waste another moment before calling 1-800-637-7740, Ext. 7170. We'll give you an encore dramatically better than the original performance.



**HEWLETT
PACKARD**



Model 715/33 - 46 SPECmark80 - 24.2 SPECint45 SPECfp - 15" color - 16MB diskless 1 EISA slot (optional) - \$5,695

Model 715/33 - 46 SPECmark80 - 24.2 SPECint45 SPECfp - 19" color - 16MB, 32MB 1 EISA slot (optional) - \$9,995

© 1992 Hewlett-Packard Company. All prices suggested U.S. list. 486/33MHz, 100MHz/33MHz

Viruses ringing in the new year



By James Daly

The holidays are over, the tree is out by the curb and the weather outside is frightful. What is there to look forward to? Virus fighting, for one thing. It may not be as exciting as shredding wrapping paper, but it may keep your data clean and secure.

In addition to the fall's usual rogues' gallery of malicious codes [CW Aug. 31], this month's virus watch features a well-known and toxic trio that infects DOS machines. Joshi, Casino and a strain of the Jerusalem virus called January 25th.

All of these unwelcome guests are theoretically categorized as nondestructive nuisances. But so was the Jernberg that sank the Titanic. Virus writers are not known for reliable code, so any of these infectors may cause a loss of data, according to officials at Fifth Generation Systems, Inc., a Baton Rouge, La.-based developer of data security software.

As with all viruses, the following occurrence dates are given for general awareness and are not exclusive. Talented programmers can easily change a few lines of code and make the virus go off whenever they desire. The old advice still holds true! Scan any new disk before it is used and backup, back up, back up.

• **Joshi** is a memory-resident boot-sector infector of disks and the hard drive partition table that activates on Jan. 5. Joshi will hang the system while displaying the message: "Type Happy Birthday Joshi." If the system user types that command, the system will be usable again.

To determine if a hard disk is infected with Joshi, look at the disk's partition table. If the first two bytes of the partition table are hex "E3B1," the hard disk is infected.

The Joshi virus can be manually removed from an infected system by powering off the system, then booting from a known clean, write-protected master DOS disk. If the system has a hard disk, the hard disk should have data and program files

backed up, and the disk must be low-level formatted.

• **Casino** is a memory-resident infector of .COM files including COM-MAND.COM. It activates on Jan. 15, April 15 and Aug. 15. Casino challenges the user to a slot machine game. If the user loses, it will trash the file allocation table.

Programs infected with Casino will have a file length increase of 2,332 to 2,346 bytes. The increase, however, is mostly hidden if the virus is memory-resident. When it is memory-resident, infected files will usually have a file length increase of 1 to 16 bytes.

• **The January 25th virus** is a strain of the well-known Jerusalem virus that activates on Jan. 25, not Friday (the 13th as is common to most Jerusalem variants). It is a memory-resident, generic file infector that attacks .COM, .EXE, .SYS, .BIN, .PIF and overlay fields when they are activated. The virus will delete any programs the user attempts to execute.

The first virus was written to spy by a University of Southern California student to demonstrate the need for computer security. In spite, only four viruses were known to exist.

Today, the unofficial DOS virus count is approximately 1,000.



Software Publishing heats up Windows database battle

CONTINUED FROM PAGE 77

company. Version 2.0 is more like other Windows programs, however, the analyst said, and the product's speed has improved as well.

Whether the enhancements are enough to stem the Access flow remains to be seen. "The thing that distinguishes Superbase here is experience in how to design database development tools under Windows," said Rich Pinkshafel, president of Performance Computing, Inc. in Chicago.

Challengers on the horizon

Superbase faces a tough road ahead, however, with Access along the route now and Borland International, Inc.'s Paradox for Windows due in January. Gibbons said he realized the dilemma, but if users give Superbase a "fair crack at the evaluation process," they might find that Software Publishing can meet their needs better than other companies.

The updated Superbase now includes support for Binary Large Objects such as graphics. It also contains support for Microsoft's Object Linking and Embedding, the Media Control Interface and Windows Pen.

Superbase 2.0 is available now for a list price of \$440.

Model 775/50 • 89 SPECS • 16.5 SPECS • 72.1 SPECS • 19" grayscale • 38MB, 525MB • 4 EISA slots • \$17,895

Model 735 • 147 SPECS • 119" color • 38MB, 525MB • 1 EISA slot • \$37,395

Model 755 • 147 SPECS • 119" color • 38MB, 525MB • 1 EISA slot • \$50,995

Building inexpensive computers isn't exactly earth-shattering news.
 Building inexpensive computers that still deliver IBM quality is.
 Yet, that's precisely what PS/ValuePoint™ does.

Introducing PS/ValuePoint



Model 325T
 386 SLT™ 25 MHz System
 2MB RAM, 80MB HD
 5 AT Slots/5 Bays
 IBM Enhanced Keyboard/
 Mouse/SVC4
 DOS 5.0 Pre-installed
 PS/2® 8511
 Color Display/PGA
\$1,299*

PS/ValuePoint is a whole family of computers that lets you spend less, without settling for less. Lets you economize, without compromise.

Each PS/ValuePoint is engineered to the IBM standards that have defined the personal computer industry. And rigorously tested to meet IBM's stringent demands for quality and reliability.

The PS/ValuePoint family is fully networkable, and Novell®-certified for use with Ethernet or Token-Ring LANs. So the PS/ValuePoint not only keeps your costs down, it protects the investments you've already made.

IBM also provides expandability for base products by offering new IBM hard drives, diskette drives and memory upgrades.



*IBM prices, dealer prices may vary. **Need business day response when serviced by IBM or IBM Authorized Personal Systems Services. Available Monday-Friday, 9 a.m. to 5 p.m. in your time zone. Warranty and 30-day guarantee information available from IBM or IBM authorized dealers. †In Canada, call 1-800-485-7100. IBM, CISC and PS/2 are registered trademarks and PS/ValuePoint, SLT, Healthcare and HelpCenter are trademarks of International Business Machines Corporation. Novell is a registered trademark of the Novell Corporation. The Intel Inside logo is a trademark of Intel Corporation. © 1992 IBM Corp.



*Models 425 SX and 433 DX are shown with the PS/ValuePoint 6314 Color Monitor.

Computers that do pr for practic



And every PS/ValuePoint includes one other very important point—HelpWare,™ IBM's unparalleled service and support that offers one-year, on-site, next-business-day service.** Around-the-clock assistance by telephone, bulletin board or automated fax. A 30-day money-back guarantee.** Licensed Education Centers. And a generous trade-in program. Plus, IBM Credit Corporation has flexible leasing and financing packages to meet your needs.

That's a support package you might not expect even on the most expensive computers. On the PS/ValuePoint it's nothing short of phenomenal. As you can see, we've stripped down the price—but not the product.



Model 433 DX†
486 DX 33 MHz System
8MB RAM, 120MB HD
Upgradable Processor
5 AT Slots/5 Bays
IBM Enhanced Keyboard/
Mouse/SVGA
OS/2® 2.0 Pre-installed
PS/ValuePoint 6312
Color Display

\$1,999*

Power. Quality. Service. Support. The PS/ValuePoint is everything you could ask for in a computer at much less than you'd expect us to ask.

For more information or an IBM authorized dealer near you, call our Personal Systems HelpCenter® at 1 800 772-2227!†

Model 425 SX
486 SX 25 MHz System
8MB RAM, 80MB HD
Upgradable Processor
5 AT Slots/5 Bays
IBM Enhanced Keyboard/
Mouse/SVGA -
OS/2 2.0 Pre-installed
PS/ValuePoint 6312
Color Display

\$1,629*

IBM®

actically everything,
ally nothing.

HELP LINE



Quattro Pro for Windows

Part of a series of user tips provided by vendors and drawn from their customer support lines. This week's topic is Borland International, Inc.'s Quattro Pro for Windows.

Q: How do I create an ASCII file in Quattro Pro for Windows?

A: There are two ways to do this: Copy your selected text into the Windows clipboard, paste into the Windows notepad and save

the notepad file. Or activate the Quattro Pro for DOS slash menu from the application menu and select /Print/Destination/ File/name the file/Spreadsheet Print.

Q: How do I import Quattro Pro WQ1 files into Quattro Pro for Windows notebook pages?

A: To import your WQ1 files into separate pages of a Quattro Pro for Windows notebook, simply select the page tab to make the page active and choose Block/Insert/File from the top menu. The

spreadsheet name will become the name of the page. Any linking syntax will need to be changed.

Q: How do I print multiple graphs?

A: To produce one graph per page, simply go to the graphs page and select the graph icons of the graphs you wish to print and then choose File/Print.

If you desire more than one graph per page, you will need to insert the graphs into a blank area of the spreadsheet, block out the spreadsheet print area and choose File/Print.

Q: What can I do in the Database Desktop that I cannot do in Quattro Pro for Windows or Quattro Pro for DOS?

A: The Database Desktop has the ability to query multiple tables, work with more than 8,192 records and edit, add, delete or change values in external database tables. These abilities are not available in Quattro Pro for Windows or any version of Quattro Pro for DOS.

Q: How do I get my 1-2-3/Quattro Pro for DOS macros (menu equivalent/keystroke) to run?

A: Choose Property/Application/Key Reader/Yes for 1-2-3 macros. For Quattro Pro DOS macros, set the Key Reader to "No" and set Property/Application/Macro/Slash key to "Quattro Pro-DOS."

Q: How do I copy using group mode?

A: There are two ways, depending on whether you are currently doing data entry or you want to copy existing data to other pages. On data entry, use CTRL+ENTER instead of ENTER to drill an entry through to all pages in a group. To copy from one page to a group of pages, you must copy to clipboard, create group and paste in that order.

Q: How do I enter a date?

A: Either perform CTRL+SHIFT/D followed by a valid date format or set Property/Current Object/Block/Data Entry Input/Dates Only and then input into a cell with a valid date format.

The Database Desktop has the ability to query multiple tables, work with more than 8,192 records and edit, add, delete or change values in external database tables. These abilities are not available in Quattro Pro for Windows or any version of Quattro Pro for DOS.



NOT CONFIGURED

CONFIGURED

Intergraph workstations are configured to handle real world applications straight out of the box.

If you're not buying Intergraph, then you're buying pieces of workstations: a color monitor, a disk, a mouse, and more memory. Then figure in the cost of application integration, worldwide customer service, and open systems solutions.

Bottom line, it takes more than just a box to get your job done. It takes solutions from Intergraph.

Call us today at 800-826-3515 or 205-730-2727 for more information on our SOLUTIONStation products and our superior portfolio of more than 1,200 integrated applications.

INTERGRAPH
Everywhere you look.

**THE COST OF
CONFIGURING
MAY BE MORE
THAN YOU'RE
FIGURING.**

**SAVE MONEY
RECRUITING
STAFF**

Advertise in Computerworld's regional Careers pages. They work.

800-343-6474
x201

Intergraph is a registered trademark and Property/Key Limit and SOLUTIONStation are trademarks of Intergraph Corporation. Copyright 1992 Intergraph Corporation, Huntsville, AL 35894-0001. 08/09/92 LAL

Macintosh products

Trend Micro Devices, Inc. has introduced SafeLock for the Apple Computer, Inc. Macintosh.

The combination of password protection, data security and virus scanning and removal capabilities are incorporated into the product.

SafeLock was designed for PowerBooks, portables and any Macintosh environment, and it restricts unauthorized access to all data on an unlimited number of Macintosh hard drives. For instant security, a Lock Now feature can be activated.

An unscheduled lock can also be used; it starts working after a manually set or pre-set period of idle time.

SafeLock costs \$49.

►Trend Micro Devices

Suite D-100

2421 W. 265th St.

Torrance, Calif. 90501

(310) 782-8190

Peripherals

Lexmark International, Inc., a former IBM division, has introduced the IBM Color Jet-printer PS 4079.

The product includes an advanced version of Adobe Systems, Inc. PostScript-compatible software and has a new Hi-MHz, full 32-bit reduced instruction set computing processor from Advanced Micro Devices, Inc.

Simultaneous connection is provided to IBM and Apple Computer, Inc. Macintosh computers. The printer offers 300 by 300 dpi/in. resolution, which, combined with an advanced screening technique called ColorGrade, allows the printer to generate true halftone quality, something usually identified with 600 dpi/in. printers.

The product costs \$3,495.

►Lexmark International

740 New Circle Road NW

Lexington, Ky. 40511

(606) 332-3000

Toshiba America Information Systems, Inc. Disk Products Division has introduced the XM-3401 Series CD-ROM disk drives.

The double-speed drives provide a 300-kiB/sec. data transfer rate and a 200-m/sec. random-access time.

A Small Computer Systems Interface (SCSI-2) interface is provided to ensure compatibility and simplify integration. Digital audio transfer over the SCSI bus is also possible. A mean time between failures of 50,000 hours and a contamination-free design are offered for reliability. The drives require 6W maximum and 4W average power consumption. Four models are available.

Prices start at \$685.

►Toshiba America

Information Systems

Disk Products Division

9740 Irvine Blvd.

Irvine, Calif. 92718

(714) 583-3000

Mass Optical Storage Technology, Inc. has introduced the RMD-5200-S drive.

The product is the first to put 256M bytes of data on a 3 1/2-in. disk drive, according to the company. Full backward compatibility and dual-mode operation are provided to the 128M-byte International Organization for Standardization (ISO) 10000 standard.

The RMD-5200-S can shift into different capacity modes by using Automatic Media Sensing for on-the-fly media identification. Users can access any track in a 128-track bank within 12 msec by using a scanning/short seek function.

The RMD-5200-S costs \$1,595.

►Mass Optical Storage Technology

1280 Knoll Ave.

Cupertino, Calif. 96030

(714) 895-9400

Polaroid Corp. has announced a Microsoft Corp. Windows-based version of its CI-700 Digital PhotoPrinter.

The product is a desktop printer that was designed for capturing and archiving hard-copy images of computer graphics

and digital video files. The CI-700 Digital PhotoPrinter can also be used for previewing and documenting works in progress and generating video storyboards. Images are exposed using LED technology; and instant 24-bit color photographs are output from digital sources in 40 seconds.


The introductory price is \$1,495.

►Polaroid

375 Technology Square

Cambridge, Mass. 02139

(617) 577-2000



Solve the CASE for Client/Server DEVELOPMENT

CLUE SEMINARS

presented by

LBMS & POWERSOFT

☐ New York
January 19, 1993

☐ Chicago
January 21, 1993

☐ San Francisco
February 3, 1993

☐ Dallas
February 5, 1993

☐ I can't attend, but don't leave me in the dark...

☐ Washington DC
March 16, 1993


☐ Atlanta
March 18, 1993

☐ Boston
March 23, 1993

☐ Los Angeles
March 25, 1993

LBMS and POWERSOFT reveal the clues to solve the mystery of "CASE for Client/Server Development" ... Discover the power of GUIs, methodology and repository-based CASE. GET CLUED IN!

To register, FAX this page to **713-623-4955** or **CALL 800-231-7515**



"The CASE for Client/Server"

Name _____

Title _____

Company _____

Address _____

Phone _____



RIGHT SIZE WITH OUR DISTRIBUTION MANAGEMENT SOFTWARE. AND YOU WON'T RUN INTO PROBLEMS.

The software you choose for distribution management is critical to your success. Pick one that doesn't measure up to your needs and rightsizing can soon go wrong.

Lawson is experienced in providing total solutions for distribution management. We design software to meet today's critical business needs, like maintaining optimum levels of customer service and inventory. And we build in

flexibility because we know, down the road, your needs can change significantly.

Our distribution management software is available for AS/400*, RS/6000*, HP 9000* and other UNIX*-based systems. We also have software for human resources, accounting and retail management. For case histories of companies that have successfully taken the road to rightsizing with Lawson software, call **1-800-477-1357, ext. 844**

LAWSON

UNIX* is a registered trademark of UNIX System Laboratories, Inc. RS/6000 and AS/400 are registered trademarks of International Business Machines Corporation. HP 9000 is a registered trademark of Hewlett-Packard Company.

SOFTWARE FOR AS/400, RS/6000 AND HP9000

Workgroup Computing

TANGLEWOOD BANK
DOWNSIZES TO PCs, BY
NEW PRODUCTS, 87

On the presidential PC trail

Gearing up for Clinton/Gore inauguration no easy task

By Rosemary Cafasso
WASHINGTON, D.C.

The information systems team of the Presidential Inaugural Committee just lived every IS executive's nightmare and dream.

In November, they were called on to network more than 400 staff members and deliver an assortment of applications to them. And they were given about six weeks to do it.

But before they could even begin to panic, the team was flooded with donated PCs and software packages from a host of computer companies that were more than willing to be associated with this prestigious group.

In fact, the Inaugural Committee was lent so much equipment—well over \$1 million worth—that it actually had to turn down some vendors' offers made in late November, said Dunkin' Ritchie, director of office automation for the committee. He would not name those vendors who were politely refused. But most of the big-name vendors, from IBM and Compaq Computer Corp. to Microsoft Corp. and Borland International, Inc., are on the roster.



President-elect Bill Clinton has an IS team of seven coordinating his inauguration with PCs donated by major hardware vendors.

Even with such assistance, the IS team of seven has been working seven-day weeks and typically 12- or 14-hour days, Ritchie said. In short, there is simply no margin for any IS delay.

With only a few weeks to spare, Ritchie's staff now has more than 300 users on IBM PCs and compatibles linked via Aristo, Inc.'s Lantastic local-area networks and another 30 users on roaming.

Unix portables still too costly

By Maryfran Johnson

Hobbled by high prices and a limited number of suppliers, the market for portable Unix workstations is still struggling to find its place in the booming business of mobile computing.

Yet a steadily growing number of users—especially field technicians, software developers and engineers—are lugging along Scalable Processor Architecture (SPARC)-based notebooks and laptop systems to remote offices and off-site meetings. Their common ground is a need to access applications on Sun Microsystems, Inc. client/server networks.

"The ability to send a workstation home with an engineer is a nice fit for a lot of companies," said Jesse Charlaus, a senior systems administrator at San Diego-based Brooktree Corp., which runs a network of 160 Sun machines. While Brooktree is not using any SPARC portables now, Charlaus said he watches that segment of the market more carefully these days.

With internal disk drive space of up to nearly 500M bytes for the leading SPARC portables and plenty of SPARC applications to run, the most serious drawback is prices in the \$6,000 to \$15,000 range.

"They are way overpriced, and they need to start driving prices down below \$5,000 to get some real volume," said Nancy Battey, an analyst at International Data Corp. in Mountain View, Calif.

"There is a lot of growth potential out there," Battey added. "In the next three years I think we'll see a real takeoff. It's where the world is moving."

The DOS-based portable market has become the fastest growing segment of the PC business—one key reason being rapidly shrinking prices. Annapolis at Technology Investment Strategies Corp. in Framingham, Mass., said the number of portables sold this year is expected to more than double—from 3.2 million in 1991 to 7.2 million in 1992.

The Unix slice of that market, however, has been too minuscule to count until now. Analysts estimate that fewer than 10,000 SPARC portables are in circulation now.

Yet the advent of smaller, cheaper microprocessors such as the 50-MHz MicroSPARC chip from Sun and Truarc Instruments, Inc. is already giving the SPARC portable market a boost. RDI Computer Corp. in San Diego, for example, is planning to ship its new **BriefLife LX** portable, based on the MicroSPARC chip, this month.

SPARC portables

A new round of on-the-road workstations will appear in Q3 '93

Tadpole Technology, Inc.
Austin, Texas
SPARCbook 2 notebook, 40-MHz processor, 500M bytes disk storage, Solaris 2.1, priced from \$7,500.

EOS Technologies, Inc.
Santa Clara, Calif.
EOSportable 150M "transportable" workstation, choice of 40-MHz or 50-MHz processor, 44M bytes disk storage, Solaris 2.1, priced from \$7,000.

RDI Computer Corp.
San Diego, Calif.
BriefLife LX, 50-MHz SPARC/enging LX processor, 450M bytes disk storage, Solaris 2.1, priced from \$5,000.

Circle 10 for more information

Portable Unix workstation users fall in a distinctly different category from DOS users. Rather than using personal productivity applications such as spreadsheets or text editors, the Unix users need on-the-road access to network-based applications. Some of the more common uses for SPARC portables include real-time data collection, satellite equipment testing or network troubleshooting from remote sites.

Among the half-dozen SPARC vendors that offer some form of portable system, the two most prominent U.S. vendors are Tadpole Technology, Inc. with its SPARCbook notebook computer and RDI with its BriefLife line of portables.

At the U.S. Department of Defense, some senior executives take RDI's BriefLife portables to off-site meetings, RDI officials said.

Another U.S. contender, EOS Technologies, Inc., plans to start shipping its "transportable" isopod SPARCstation-compatible library in Japan. SPARC portables are now shipping from Toshiba Corp., Matsushita Electric Industrial Co., Fujitsu Ltd. and Sony Corp.

32-bit card fits MCA

IBM tries to break adapter mold

By Lynda Radosevich

IBM confirmed reports that it plans to enter the high-performance adapter card market soon by announcing a 32-bit Token Ring adapter for Micro Channel Architecture (MCA)-based Personal System Workstations.

The 32-bit card could be useful in certain server applications, said Tom Nolle, president of CIMI Corp., a consulting company in Voorhees, N.J. For example, a server using a Small Computer Systems Interface (SCSI) adapter to control high-performance peripheral devices such as optical disc storage can become performance-bound by an 8- or 16-bit network adapter. A 32-bit adapter could help break that bottleneck, he said.

An IBM official named multimedia applications as one of the forces driving the need for the new card. But "this is not a demand-driven market,"

Nolle said. "The tendency is to announce high-performance products because they differentiate a company in a market dominated by \$200 adapters."

For Jim Queen, local-area network manager at Euron Gas Services Corp. in Houston, the added muscle of a 32-bit Token Ring adapter card is attractive, whether or not the need for high throughput is there. "We get good performance out of the 8-bit card, but if we can get faster performance for the same price, we'll do it," he said.

No small sharks

Although IBM has not disclosed pricing for the new cards, other high-performance adapter cards cost seven to 10 times more than commodity 8- and 16-bit Token Ring adapter cards. For example, Toltec Ring compiler Madge Networks, Inc. in San Jose, Calif., offers

Adapters, page 88

Developing client/server applications doesn't have to be a nightmare.

The issue isn't whether to develop client/server applications—the question is *how*. How do you combine the expertise of PC and mainframe developers into productive teams to deliver large-scale client/server systems quickly?

INTERSOLV's interchangeable, yet integratable desktop development solutions put your resources to work today building real-world client/server applications. Your teams can exploit new application architectures, including GUIs and cooperative processing, without retraining in new technologies or languages. Unlike other tools, INTERSOLV solutions automate all of your real-world development needs: from GUI clients to enterprise-strength transaction management and host processing.

INTERSOLV manages the complexities of distributing data and function across multiple tiers in a cooperative

processing environment. Your workgroups are free to focus on more important things: designing friendly graphical interfaces and addressing the real business needs. All of which gives you the competitive advantage!

INTERSOLV's desktop development solutions give you secure, real-time information sharing via a LAN repository, flexible support for the way you work, and the ability to reuse your existing applications...and your nights free from the LU6.2 demons!

For more information about INTERSOLV products or a seminar in your area, call TOLL-FREE 1-800-777-8858, extension 111.

INTERSOLV

Attend INTERSOLV Free Seminar, "Developing Enterprise-Strength Client/Server Applications"

LOCATION	DATE
Austin, TX	March 4, 1993
Baltimore, MD	February 12, 1993
Birmingham, AL	March 2, 1993
Boston, MA	February 23, 1993
Chicago, IL	February 10, 1993
Cincinnati, OH	February 17, 1993
Dallas, TX	February 4, 1993
Denver, CO	February 17, 1993
Detroit, MI	February 11, 1993
Harrisburg, PA	February 16, 1993
Houston, TX	February 5, 1993
Indianapolis, IN	March 11, 1993
Los Angeles, CA	February 3, 1993
Minneapolis, MN	March 4, 1993
New Orleans, LA	February 25, 1993
New York, NY	February 9, 1993
Orlando, FL	February 11, 1993
Philadelphia, PA	March 11, 1993
Phoenix, AZ	February 24, 1993
Pittsburgh, PA	February 24, 1993
Portland, OR	February 23, 1993
Richmond, VA	February 25, 1993
Saddlebrook, NJ	February 10, 1993
Salt Lake City, UT	March 3, 1993
San Antonio, TX	February 18, 1993
San Francisco, CA	February 2, 1993
Seattle, WA	March 2, 1993
St. Louis, MO	March 9, 1993
Tulsa, OK	February 9, 1993
Washington, DC	March 3, 1993

Client/server can be fun and games

By Mark Halper
HOUSTON

A recent client/server conversion at Tanglewood Bank involved many of the usual ingredients: a systems integrator, a local-area network, a relational database, some terminal emulation products, a 486 server and, oh yes, a card game.

Some 10 PC users at the \$470 million commercial bank discovered that one way to adjust to working in Microsoft Corp.'s Windows after 10 years of mainframe computing was to fiddle around with the Windows solitaire game, recalled Jerome Simon, Tanglewood's executive vice president.

Games aside, the client/server project has streamlined the bank's operating efficiency. Before the conversion, implemented by integrator Electronic Data Systems Corp. last summer, some 30 PC-equipped bank officers and other staff members had to access a customer's records one at a time.

A user had to make separate requests, for instance, for a customer's loan status and direct deposit and checking account information.

To call records down from the remote IBM 3090 mainframe—a also operated by EDS—users worked with a rigid menu system that was part of EDS' Bank Management Information System (BMIS), an integrated CICS-based banking software program.

But EDS' installation of Microsoft's SQL Server software and client-side Windows changed all that. EDS loaded SQL Server onto a Dell Computer Corp. 486 server for downloading customer files from its Dallas-based 3090 over a 3270 LAN gateway.

The result: The 50 PC users can now call up all of a customer's records with one command. SQL Server delivers those records via a Banyan Systems, Inc. Vines LAN, which was already in use. To open a new record as file, the user simply opens a new window and requests the information.

The new system "puts all of your customer information at your fingertips," Simon said.

Mum on costs

Neither Simon nor Charles Manning, EDS' financial services product manager for micro technology, would say how much the project cost EDS or what EDS charged the bank. Manning said three EDS developers took three months to write code for the project, and EDS began laying the foundation for the project about one year ago.

But in addition to providing development and implementation, EDS also acted as product middleman, setting and leasing hardware to the bank.

Among the new hardware requirements for the system are roughly 25 new 486 PCs to replace client PCs. Tanglewood leases the new PCs from EDS.

Although EDS brought Windows and SQL up in one weekend in early July, the user shift was gradual. Prior to the conversion, EDS provided all 50 users with four hours of Windows training.

And until mid-September, while the bank used Windows for applications such as spreadsheets and office automation, it continued to access customer records through BMIS. The bank has been using the SQL Server software and the file loader customer record system for about three months now.

The bank has also not completely forsaken the BMIS system. It continues to leave what Manning called "account detail" information on BMIS and calls it down when necessary.

BMIS records include information such as customer history, clerical data and utility information that a loan officer would not need as often as the "customer information" stored on SQL Server, according to Simon.

Imagining ahead

Meanwhile, the system is still evolving. EDS is developing imaging technology that the bank hopes to bring on-line by March 1993. The imaging system will allow the bank to scan customer documents such as signature cards and account applications into its records and will require an optical

storage device.

Meanwhile, the bank's users have had little problem letting go of their old hierarchical habits. According to Simon, EDS designed client PC connections so that users could choose to remain on BMIS if they wanted.

But Simon said, "they just haven't done it." They grew into Windows proficiency about 10 days after EDS loaded the software, he noted.

So have the users stopped playing solitaire?

"I hope so," Simon said.



Start Your Day With A Global IT News Review For Only 75¢!

**IDG International News
Group, A Division of
International Data
Group, Announces —**

IT DAILY NEWS
Global Information
Technology News
Delivered To Your Fax
Every Morning.

**Charter Enrollment
Limited To First 600
Subscribers Only!**

Introducing the fastest way to get strategic news.

All you need is a telephone, a fax machine and the desire to get the competitive edge.

IT Daily News is the industry's first on-demand, custom, fax-back news service. It's the ultimate in time-saving, cost-effective delivery of information you need to know quickly.

Here's how it works. Every morning by 6:00 a.m. Eastern Time, we fax you a complete menu of major computer-industry headlines from around the world.

Just scanning the daily menu for 30 to 60 seconds briefs you on the entire state-of-the-industry. If you find news you need to know more about, dial our toll-free number and order the full-text article. Within five minutes, the complete text arrives via fax. It's that easy!

You can access IT Daily News 7 days a week, 24-hours a day from the IDG International News Group world network!

Whether it's news of a product release or a merger or acquisition that may affect your strategic plans...

...whether it's a marketing move by one of your competitors or a breakthrough technology from one of your vendors... if you need to know about it today, IT Daily News is the only way.

**Free Information In
5 Minutes.**

Just call the number below and enter your fax number at the prompt. We'll send you free information and a Charter registration form via fax within 5 minutes. (There is no cost, no obligation to subscribe.)

IDG DAILYNEWS
The International Data Group World Network

Turn Your Fax Into A Competitive Weapon

CALL NOW! 1-800-723-6707

Please Have Your Fax Number Ready

In Brief

AST RAID debuts

AST Research, Inc. recently introduced multichannel redundant arrays of inexpensive disks (RAID) subsystems for its Premium SE server and Manhattan SMP multiprocessor lines. The arrays, which support RAID Levels 0, 1, 5 and a proprietary level called AST RAID 6, come in three- and five-channel versions, priced at \$2,895 and \$3,995, respectively.

On the presidential PC trail

CONTINUED FROM PAGE 35

in prayer services — that will accompany the inauguration of Bill Clinton as the 52nd president of the U.S. The staff members are required to perfectly orchestrate the events of the inauguration, down to the last seating arrangement, before the festivities begin Jan. 17.

To cope with this pressure, Ritchie's team took a no-fuss approach.

There were no significant planning sessions or product evaluations. Instead, the team identified what the most basic user needs were and then filled them with the readily available software.

IS had plenty to work with. IBM, for instance, sent along more than 200 Personal Systems, 2, and Apple dispatched 50 Macintoshes to the committee's Washington headquarters.

WordPerfect Corp. lent a 200-megabyte license for its word processing software and Borland provided spreadsheets and database software.

By virtue of being there first, these products became platforms and applications of

choice for the committee.

For more specific needs, Ritchie placed telephone calls to vendors "at random" and "those that stepped up quickly we went with," he said.

The goal was to be keep things as simple as possible. Ritchie's team requested MS-

DOS applications to minimize any training time users might require on Microsoft's Windows platform.

IS was able to get basic tools delivered in November and December.

"We have to make sure they can write letters, memos, plans and recommendations," Ritchie said, "it's all the paper communication that is necessary to pull off an event like this."

Hundreds of full-time workers, along with thousands of volunteers, are now

turning out correspondence and managing guest lists, entertainment and personnel from the committee's headquarters, which takes up 94,000 sq ft of office space.

IS worked with a "building blocks" approach, Ritchie said. As the staff became functional, IS began installing LANs. First, teams were linked. Then electronic mail was installed.

Ritchie's team is now linking the many LANs together so larger groups of staff members can communicate.

ESCON lets the

To maximize the power, speed and connectivity of ES/9000® computing, you've got to keep information flowing in and out as smoothly—and economically—as possible.

Which is precisely what ESCON® was created to do. And precisely what IBM's exclusive EMIF helps it do even better.

ESCON is Enterprise Systems Connection Architecture™ high-capacity input/output connections based on slim, ultraefficient

Because ESCON works with light, not electricity, long-distance data transmissions are possible. So you can locate data storage offsite, where costs are lower and security higher. In addition, ESCON lets you hot-plug, so you can add or change connections without shutting down the system.

EMIF

ESCON Multiple Image Facility



Faster, more reliable data flow, in a fraction of the space. That's the promise of ESCON fiber optic channels and EMIF.

fiber optics. Instead of bulky, hard-to-manage copper cable. For each communications path, two slender fiber optic conduits can replace 40 copper conductors, delivering tremendous savings in weight and volume.

IBM is a registered trademark and ES/9000, ESCON and Enterprise Systems Connection Architecture are trademarks of International Business Machines Corporation. © 1992 IBM Corp.



IBM tries to break adapter mold

CONTINUED FROM PAGE 35

32-bit Token Ring Extended Industry Standard Architecture and MCA cards for around \$1,300. The 32-bit Ethernet cards are available from many vendors, and they range in price from \$700 to \$1,000.

IBM said its 32-bit Busmaster 16/4 Token Ring adapter will support 32-bit addressing and data streaming — its fast data-transfer technology that doubles the MCA data transfer rate to 40M byte/sec.

It will support shielded and unshielded twisted-pair cabling and is expected to be available in the first half of next year.

IBM is also working on client/server software that will run under LAN Server 3.0. The software will monitor the network and limit the number of concurrent multimedia sessions running on a 16M byte/sec. Token Ring local-area network to make certain that available bandwidth is not exceeded.

Workgroup software applications

Keyfile Corp. has introduced Version 2.0 of Keyfile, an enhancement to the company's integrated document management software.

More than 50 product enhancements

have been added to this version, including TIFF-4 technology and Typomatic comments designed to offer more powerful handling of electronic documents and forms, improved document indexing and faster document handling, the company reported.

Three configurations of Version 2.0 are offered: the Keyfile Personal Edition for single users; Keyfile Workgroup Edition for workgroups of up to five people; and the original Keyfile Enterprise Product for

large departments.

Pricing for the product enhancement begins at \$395.

► **Keyfile**
22 Cotton Road
Needham, N.H. 03063
(603) 852-3809

Aperco Technology, Inc. has announced the WinLAN network adapter.

The adapter was designed for Version 3.1 of Microsoft Corp.'s Windows for Work-

groups operating environment. Users can build a full-function workgroup local-area network with features such as electronic mail, file sharing, printer sharing and group scheduling when the adapter is combined with software from Windows for Workgroups.

Peer-to-peer networking is available for a workgroup of PC users because the WinLAN adapter can be installed in any IBM-compatible PC. WinLAN adapter operates at 500K bytes.

A two-PC network starter kit is priced at \$190.

► **Aperco Technology**
958 E. Brannum Drive
Boise, Idaho 83702
(208) 335-0632

Above Software, Inc. has introduced a special edition of Golden Retriever that was designed for workgroups.

Golden Retriever is an information navigator for Microsoft Corp.'s Windows 3.1 that assists users in managing documents, spreadsheets, database records and other logical relationships, the company reported.

Electronic file drawers and file folders are provided, and file names of up to 255 characters long can be used.

Until Feb. 15, Golden Retriever is available directly from Above Software for \$50.

► **Above Software**
#260
3688 White Road
Irvine, Calif. 92714
(714) 851-5283

Unix

Pacific Software Group has introduced Version 1.0 of TaskMaster for Unix.

TaskMaster is a visual file manager and personal productivity tool. A point-and-shoot interface is offered for controlling system functions and utilities and managing files.

Users are able to build movies as well as run applications, create backups, find and browse files and directories and control print jobs.

The ability to read and send mail as well as delete and undelete files is also provided. Personal and group reminders can be scheduled that notify users even when they are not in TaskMaster, according to the company.

A 10-user license costs \$295. An unlimited user license costs \$505.

► **Pacific Software Group**
4703 Pully Lane,
Riverside, Calif. 92509
(909) 681-2623

information flow.

EMIF: a channel saved is a dollar earned.

With EMIF—IBM's exclusive ESCON Multiple Image Facility—your whole input/output configuration becomes even more cost-efficient. EMIF allows multiple logical partitions running on a single processor to share physical

I/O channels—so each channel can now do the work of several.

EMIF maximizes the use of the channels you already have. Helps avoid the expense and complication of adding new ones. And boosts ESCON's

already-impressive efficiencies to levels unrivaled by any other technology.

In other words, EMIF can work wonders not just for your information flow, but for your cash flow.

And can deliver the hard-dollar savings that make ESCON look as good on a balance sheet as it does on a spec sheet.

EMIF is ready today on high-end, water-cooled ES/9000 machines. And it's coming to other models soon.

To have an IBM marketing representative contact you, call 1 800 IBM-6676, ext. 711.

And get ready to go with the flow.



16 CHANNELS
Without EMIF, each logical partition needs its own dedicated channel.



4 CHANNELS
EMIF allows simple, efficient channel sharing, which can significantly cut costs.

IBM

DO YOU SELL SOLUTIONS?

Advertise your hardware and software solutions in Computerworld's weekly Solutions Directory. Rates start at just \$499 for 26 weeks.

800-343-6474

z744

Why people who know aren't going anywhere

Over 18 million people use some version of Lotus® 1-2-3® every day. They depend on it. They trust it. They know it. Which is why, if they're moving from DOS to Windows, they're moving to 1-2-3 for Windows... for some very good reasons.

**They know that *only* 1-2-3 is
fully compatible with 1-2-3.**

Only 1-2-3 for Windows is able to read and execute every 1-2-3 for DOS file, style and macro. Which means you can preserve your full investment in 1-2-3 for DOS files when you move to 1-2-3 for Windows. And only 1-2-3 for Windows—with its built-in Classic® Menu—lets you use all your familiar 1-2-3 commands.

**They know that 1-2-3 offers
the *best* 3D technology.**

Only 1-2-3's 3D technology gives you easy access to 256 worksheets and lets you build 3D formulas just like you do in 2D. Which ultimately makes consolidating, comparing and analyzing data much simpler. In comparison, Excel's Workbook™ is a limited imitation of true 3D. And while working in Group Mode in Borland's® Quattro® Pro for Windows, simply cutting a range of data in one sheet unfortunately means you'll delete the data on every sheet. And what's worse, you can't undo it. All of which means if the analytical power of 3D technology is important to you, 1-2-3 is still the best choice you can make.

**They know that 1-2-3 for
Windows now includes
the *most asked-for*
enhancements.**

The new release of 1-2-3 for Windows Release 1.1 includes a number of performance enhancements. For example, it's now the fastest Windows spreadsheet for printing on PostScript® printers. And it's also the fastest to launch. We've also added over 25 innovative new features, usability enhancements and GUI development tools. The result? 1-2-3 for Windows is now more powerful and easier to use than ever before.

**They know that 1-2-3 for
Windows offers *unmatched*
database capabilities.**

It's true. If you're a spreadsheet user who needs to access external databases, 1-2-3 for Windows remains unmatched—particularly if you need relational capabilities. In fact, *Corporate Computing* (August 1992) recently wrote that "for the experienced 1-2-3 database user, 1-2-3 for Windows with DataLens® is the front-end tool of choice."

now spreadsheets here without 1-2-3.



They know we're the *best*
company to do business with.

Not only do more people prefer our product, but according to the ComputerWorld Spreadsheet Brand Preference Study, more people prefer our company. And even more recently, the Information Technology Association of America announced that Lotus has been awarded its prestigious Quality Award recognizing outstanding customer service and customer satisfaction.

So if you're staying in DOS or moving to Windows or still trying to decide, remember one thing. That people who know spreadsheets are staying with 1-2-3. Call us today for your free demo disk at **1-800-TRADEUP ext. 7364*** or visit your Lotus Authorized Reseller.

Lotus

1-2-3 for Windows



The Bigger You Think, The Smaller It Gets

With BT's Global Network Services, You're Always in Touch.

Going Further. Global operations can bring new challenges—cultural, technical, practical. But BT™ makes it smoother and simpler, because we've been there. We *are* there. Our international presence is

unmatched by any other communications company. That means you can cross continents and cultures and stay in control. No matter what you choose from BT's global portfolio, BT goes further for you.

Staying Closer. At BT, we make it our business to know yours. We tailor our technology to deliver the right solutions for you. Your investment is future-proof, with BT as your partner.

To find out how, call for our **Going Further, Staying Closer** brochure. 1-800-872-7654 in the U.S., or 1-800-874-7654 in Canada.



Going Further Staying Closer™

GLOBAL NETWORK SERVICES™, FRAME RELAY, VIDEOCONFERENCING, EDI, ELECTRONIC TRANSACTION SERVICES, MESSAGING, FINANCIAL TRADING SYSTEMS, AND GLOBAL NETWORK OUTSOURCING FROM SYNERGIA™.

©British Telecommunications plc 1992

2945-013

Enterprise Networking

IBM CALLS ON ISSC FOR
IMPLEMENTATION HELP, \$9
THE LATEST IN DESKTOP VIDEO
PRODUCTS, \$5

Printing eased

Protocol promises to greatly simplify networked printing

By Elisabeth Horvitz
BOSTON

Twenty months after its formation, the Network Printing Alliance (NPA) is launching the first release of a protocol that promises users greater ease in operating printer-over-networks.

The alliance was formed in April 1991 by Insight Development, Intel Corp., Lexmark International and Texas Instruments, Inc. to develop the following:

- A standardized, bidirectional interface that allows printers and computers to interact at speeds of up to 10 Gbytes/sec.

- A protocol that would enable printers to return status and other data to computers independent of the computer's operating system and the printer's datastream type.

Scheduled for general release at NetWorld '93, the next work, the protocol should ease some long-standing user printing problems, such as the difficulty of finding out whether a job is getting done and what is holding it up without traveling bodily in the printer with an instruction manual, according to Rob Auster, vice president of electronic printing at Norwell, Mass., research firm BIS Strategic Decisions.

Despite their increased capacity and bells and whistles, printers have stayed well behind PCs when it comes to ease of use, particularly when a diverse body of PCs, applications and printers are communicating over a local-area network, Auster said. "The last thing you want to do is walk down to the printer and figure out what state it's in—whether the paper is in" and what type of fonts and printer definition languages are being used, he added.

Some users at BIS, for example, came to grief because they were given a printer that used Adobe Systems, Inc.'s PostScript when their applications were set to Hewlett-Packard Co.'s Printer Control Language, Auster said. "It took us a day and a half of sitting at the front panel, book in hand, to turn on the HP emulation" on the printer, he added.

The NPA Protocol should help
Printing, page 90

The joys of communicating

The Network Printing Alliance's high-speed interface should support the following types of interaction between a printer and a system sending a job:

I CAN'T RUN THAT JOB USING MY CURRENT PRINTING INFORMATION. CAN YOU CHANGE IT?

YOUR JOB ISN'T FITTING THROUGH MY PAPER. I RUN OUT OF PAPER.

THIS PRINTER'S JOB QUEUE IS OVERLOADED. HERE IS A LIST OF OTHER PRINTERS WITH SIMILAR CHARACTERISTICS ON THE NETWORK.



On Chen: Michael Nappi

Medical center builds critical LAN

By Michele Dester

The applications that are the most mission-critical are the ones on which people's lives depend. St. Agnes Medical Center in Fresno, Calif., has built a 900-user local-area network that supports both mission-critical patient-care applications and office productivity applications and has an uptime record of 99.9%.

The St. Agnes information systems staff credits its success in building such a stable LAN to the foresight and support of management and to a penchant for careful planning and testing. "Our CFO in 1988, and our CEO today, are very

Medical center, page 98



At St. Agnes Medical Center, Harry Kolehian, systems analyst (left) and Wayne Robertson, network administrator, contribute to mission-critical LAN strategy to keep hospital on cutting edge of patient care

Cabletron fine-tunes ATM migration scheme

By Joanie M. Wexler
ROCHESTER, N.Y.

Cabletron Systems, Inc. has nailed down the details of a plan it outlined in November for migrating its local-area network customers to the scalable bandwidth and predictable-delay benefits of Asynchronous Transfer Mode (ATM) networking.

The vendor's four-phase scheme stretches from the upcoming NetWorld show to mid-1994 (see box at right). Cabletron said it intends to kick off the first phase at NetWorld '93, Boston, Jan. 12-14. The vendor, which has teamed with Fore Systems, Inc. in Pittsburgh, will show its Multi Media Access Center (MMAC) hubs linking into Fore Systems' ASX-100 ATM switch.

The demo will provide Ethernet, Token Ring and Fiber Distributed Data Interface LANs with the non-blocking 2.5 Gbps backbone of the ASX-100's backplane. A nonblocking architecture means traffic communicating over the backplane does not contend for bandwidth.

Chassis of top LAN speeds are nailed up to ensure native LAN speed networking. Router vendors Coral Networks, Inc. and Network Systems Corp. incorporate nonblocking schemes in their routers.

In this first phase, MMAC-connected networks will remain shared-medium LANs, but their packets will be converted to and from nonblocking ATM cells when traveling through the ASX-100.

Fore Systems, like its competitor Adaptive Corp. in Redwood City, Calif., makes stand-alone LAN switches based on ATM cell technology. Users of shared-medium LANs, such as Ethernet, have expressed interest in migrating to ATM for multimedia and other high-bandwidth, delay-sensitive applications.

But how much mainstream ATM networking will be going on in the near future may not match the hype the technology has received.

For example, the city of Milwaukee, an MMAC site, is "tired of being on the bleeding edge," said Joe O'Johann, microcomputer specialist. He said he is looking first to accommodate higher speed applications in his wide-area network rather than on his LAN.

O'Johann said it is "too early" for him to know what kind of LAN ATM applications he might have. He currently relies on his 100-Mbps, multi-processor/Net/Net network from Bascul-Datamarc, Inc., which carries mainframe sessions and multiple protocols on a single wire.

"I don't think on a major scale [ATM] will be needed by 1994," said Paul Callahan, senior analyst at Forrester Research, Inc. in Cambridge, Mass.

Callahan applauded Cabletron's business about some limits of ATM technology, such as its currently being Transmission Control Protocol/Internet Protocol-specific.

Cabletron's Phase 2 will add support of Novell, Inc. IPX, DECnet Phase IV, AppleTalk, Open Systems Interconnect and Xerox Network Services protocols so users can link to servers speaking these protocols through the ATM switch.

Strategies such as Cabletron's blur the lines between bridge/router firms such as Cisco Systems, Inc. and Wolfnet Communications, Inc. and hub vendors. Cabletron's Phase 3, for example, calls for each LAN interface module in Cabletron's next-generation ATM hub to handle routing and bridging.

"If these guys can cost-effectively build in routing at the hub level, they could really start to pressure the router vendors," Callahan said.

Timing through NetWorld
Phase 1 of Cabletron's basic wiring hub modules will be between ATM switches and January 1993.
Phase 2 of ATM becomes backbone interconnection network, as MMAC goes to ASX-100 ATM switch, will be at NetWorld '93, Boston, Jan. 12-14.
Phase 3 of MMAC networking module that supports P, IPX, DECnet, AppleTalk, OSI and SNA, Q3 1993.
Phase 4 of MMAC networking module that supports P, IPX, DECnet, AppleTalk, OSI and SNA, Q3 1993.
Phase 5 of MMAC networking module that supports P, IPX, DECnet, AppleTalk, OSI and SNA, Q3 1993.

Networking boost for message queuing

By Elisabeth Horwitz

Systems Strategies, Inc. will help IBM implement its message and queuing technology for distributing applications across multivendor, networked environments.

Introduced by IBM in September, Mes-

sage Queue Interface (MQI) "is one of three interprocess communications paradigms that we see as fundamental to the IBM Blueprint strategy" for building distributed, networked applications across multivendor environments, IBM spokesman Graham Tuttle said.

The other two paradigms, Remote Procedure Call (RPC) and IBM's LU6.2, also enable distributed systems to exchange data, queries and tasks as they cooperate on an application, Tuttle said. Their drawback is that such transactions cannot take place unless the two systems involved are

up and available to each other at the same time, according to Systems Strategies spokesman Les Yeaman.

In addition, the RPC and LU6.2 interfaces do not entirely screen application developers from the technicalities of the underlying network protocols, Tuttle said.

In contrast, an MQI-based application enables one system to send queries or data without assuming that "there's always a connection between it and its partner," Tuttle said. If the receiving partner is busy or down, or the link fails, messages wait in a queue until the connection can be established, he added.

This means two or more systems cooperating on a job can work on their tasks without waiting to hear from the other systems. That's important when systems are working on several jobs at once or reside at different sites that cannot always establish long-term links, Tuttle said.

MQI also enables application developers to hide the differences in operating systems and byte-storing methods when building applications on a multipatform environment, Yeaman said.

Part of the family

Systems Strategies said it will offer MQI on its EZBridge Transact product family, which is said to provide message-based distributed processing across Digital Equipment Corp. VMS, Tandem Computers, Inc. and Sirius Computer, Inc. Systems/88 systems.

MQI support for EZBridge products will be rolled out in early summer through early fall 1993, Yeaman said. Users meanwhile can begin building applications on the existing EZBridge and migrate easily to MQI, he added.

IBM plans to roll out MQI for its major platforms, including CICS, Application System/400 and OS/2 by mid-1993, Tuttle said.

How to avoid Jet lag.



Choose accessories that keep pace with the fast HP LaserJet III Si printer.

With the 17-page-per-minute HP LaserJet III Si printer, it takes less time to print a page than to walk over and take it out of the printer. It's perfect for shared or networked environments.

Now you can add accessories designed to make your high-capacity printing solution even more productive. The new 1,500-sheet HP paper feeder lets your HP LaserJet III Si printer and the people using it get more done between refills. And switch between paper trays without getting up.

Your company will save even more time by keeping paper, toner cartridges, and other supplies in one convenient location—underneath the printer. The HP LaserJet printer cabinet is roomy on the inside, compact on the outside. It was custom designed to match the footprint of the HP LaserJet III Si printer with an HP paper feeder. Exactly.

Get your company's high-capacity printing solution off to a flying start. See your authorized HP reseller or contact your HP sales representative about the HP LaserJet III Si printer and custom accessories. For more information call 1-800-752-0000, ext. 7000.



Enhance the high-capacity HP LaserJet III Si printing solution with the HP C2601A paper feeder, and the HP C2601A LaserJet printer cabinet.



HEWLETT
PACKARD

In Brief

Secure testing facility

Verdex Corp.'s Secure Products Division has opened the Verdex Application Center, a test bed facility for the secure networking community to test interoperability among different vendors' secure products. The test bed, in Chantilly, Va., will use a range of secure and nonsecure computers, operating systems and networking environments, Verdex said.

BT crosses the globe

BT extended its Express Lane frame-relay service to Sydney, Australia; Brussels; Toronto; Frankfurt; Hong Kong; Tokyo; Amsterdam; Singapore; Stockholm; and several sites in the UK. BT now provides local frame-relay access to more than 300 cities, the firm said.

Vendors advance desktop video

By Lynda Radosevich

Your average PC user may not have much use for desktop video yet, but that is not going to stop vendors from forging ahead with new products, particularly ones with a focus on communications technology.

Technologies such as desktop videconferencing will not build broad market appeal until at least 1995, said Paul Callahan, senior analyst for the network strategy service at Burroughes Research, Inc. in Cambridge, Mass. "But vendors want people to go to the desktop right away."

Evidence of this abundance in recent announcements from several companies.

Workstation Technologies, Inc. in Irvine, Calif., introduced a television tuner that brings live broadcast TV signals to the computer desktop. Targeted to system integrators and resellers, the product re-

ceives UHF and VHF signals and provides video output to video digitizing cards, which are sold separately.

Scientific Atlanta, Inc. in Norcross, Ga., announced a business video system that allows companies to transmit videoconferences to users at their desktops. Users can employ the system's multimedia capabili-

ties to ask questions of presenters and exchange documents. The system comes with a wireless transmitter that broadcasts signals to receivers that relay the signals to participants' desktops.

Software that adds multimedia mail capabilities to Microsoft Corp.'s Windows for Workgroups was announced last month by

Level Systems International, Inc. in Princeton, N.J. The product enables users to create, transmit and play electronic-mail messages that combine text, audio, graphics, images and video.

Dow Jones & Co. and Nynex Corp. have signed on VSS, Inc. in Manassas, Va., to develop software that will provide users of the News Manager information service access to live and taped TV and audio reports as well as financial reports. *The Wall Street Journal* and press release wires.

Networked printing eased

CONTINUED FROM PAGE 55

users in several ways, Auster said. First, it defines a bidirectional, high-speed interface so printers can interact with PCs, hosts and print servers while continuing to take jobs. Secondly, it defines how the printer can send useful data to a system, including status information such as available fonts, memory and paper and whether the printer is going to be busy for a while.

The protocol was designed to be independent of LAN, operating system and workstation environment.

Key 1995 goal

A major goal for the NPA in 1995 is to encourage industry support of the standard. Lexmark and TI are pushing to bring out printers based on the NPA Protocol next year, an NPA spokesman said. Also, some 50 firms have voiced an interest in the protocol, including IBM, Xerox Corp., Microsoft Corp. and Compaq Computer Corp.

"The group needs to work with operating system vendors like Microsoft to make them aware that they can now develop drivers to talk to the printer," Auster said.

Indeed, the protocol can be used to set up a job allocation service that "knows what printers are out there, so if I try to print and the printer is not available, it comes up with a list of printers with similar options," an Intel spokesman said.

The protocol may also enable the printer to recognize when an application is using an incompatible printer definition language, find out what language it is and then change its own language to match, he said.

One important holdout from the NPA group is HP, which has been developing its own high-speed bidirectional protocol, the Intel spokesman said. Indeed, NPA originally got together to "put themselves on a common ground with HP by developing a protocol as good as or better than HP's," an NPA spokesman said.

ONLY TWO DATABASE SERVERS DELIVER THE POWER AND PRODUCTIVITY YOUR CLIENT/SERVER SOLUTION NEEDS, DESKTOP TO DATA CENTER.

ORACLE⁷

CINCOM SUPRA SERVER

YOU SHOULD LOOK AT BOTH. CLOSELY.

To Find Out More, Call 1-800-543-3010 Today.
Outside The U.S., Call 1-513-662-2300.

CINCOM.
The Smart Choice

© 1992 Cincom Systems, Inc.
All trademarks are trademarks or registered trademarks of their respective companies.

Don't miss our FREE SUPRA Seminar Series "Beyond Client/Server: Thinking In The 90s." Call 1-800-543-3010 for cities and dates.

Our e-mail system lets you s of the most complex ne

At Lotus, we have the solution for communicating across the vast network you see before you: *cc:Mail*, the world's leading LAN-based electronic mail system.

With cc:Mail, you'll have full connectivity and transparent cross-platform communication at every level of your organization. Our e-mail system was built from the ground up to support network environments of different platforms and LANS—without the need for gateways. So you don't have to worry about reaching the people you need to reach.



A Mail System That Has All The Obstacles Licked.

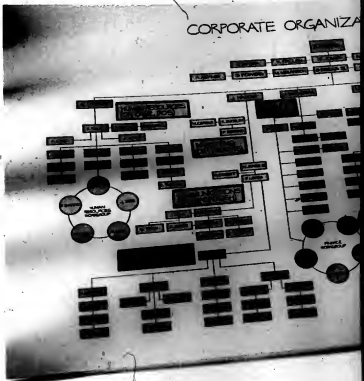
Want to send text? Files? Graphics?
Or Faxes? To Bob? Carol? Ted? Or Alice?
With cc:Mail you can.
Whether they're on
the road or at home,
whether they're on
Macintosh®, DOS,



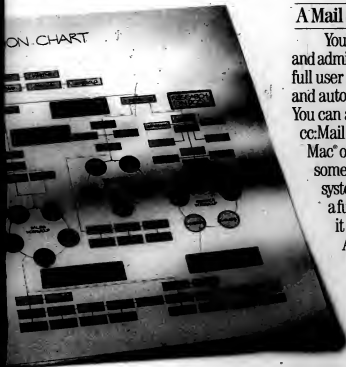
▲ What platforms does cc:Mail run on? A better question
might be what platforms doesn't it run on.

Windows,™ OS/2® or UNIX,® whether they're
on Banyan,® Novell,® LAN Manager or
Appleshare,
cc:Mail delivers.

Even if you
want to send mail
messages to private



Send messages through one network known to man.



▲ With cc:Mail, you can send a message to anyone in your organization, no matter what network, platform, or continent they're working on.

and public e-mail systems, you can do so via cc:Mail gateways for IBM® PROFS®, MHS, X.400, MCI Mail®, SMTP, SoftSwitch, DEC® and others.

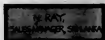
A Mail System That Makes Life Easier.

You'll find cc:Mail easy to install, maintain and administer, thanks to time-saving tools like full user move, directory synch and reporting, and automatic backup.

You can also administer cc:Mail from any PC or

Mac® on the network—something other e-mail

systems don't let you do. cc:Mail is built on a fully scalable architecture. Which means it can accommodate 5 to 500,000 users. And grow along with your business.



▲ cc:Mail keeps everyone in the loop, even the person who's always out of it.

A Mail System That Has Everyone's Stamp of Approval.

Over two million people from around the world already use award-winning cc:Mail. So if you're looking to standardize your e-mail system, you've come to the right place.

For a free demo disk of cc:Mail on the platform of your choice, call 1-800-448-2500. You'll find getting through to people at the office isn't so hard after all.

Lotus cc:Mail

Introducing
LAN Server 3.0



Welcome

Now all that network computing was supposed to be, can be. Our new OS/2® LAN Server 3.0



has the functionality, flexibility and high

performance to maximize all your network resources. So from individual departments to entire companies, it can make a difference all across the LAN.

Unlike a dedicated NOS, LAN Server 3.0 is built on top

LAN Server 3.0 Advantages:

Reduces Cost.

- Leadership performance.
- Dedicated hardware not required.

Improves LAN administrator productivity.

- Graphical installation tool.
- Remote/unattended installation option.
- Support for remote administration.

Reduces client server application development cost.

- Exploits power of OS/2 2.0.
- Common development platform at client and server.

For additional performance and/or functional information call 1 800 3-IBM-OS/2

LAN of plenty.

of OS/2. So you get the benefits of pre-emptive multitasking, enhanced OS/2 Crash Protection™ and the Workplace Shell™ GUI. Advanced and Entry versions both support the latest versions of OS/2, DOS and Windows™ on

Token-Ring, Ethernet and IBM PC Network. There's support for Peer Services, optional support for Macintosh computers and TCP/IP, and you can connect more than 1,000 users on a single LAN.

Our Advanced

to the



version offers a new
High Performance File

System (HPFS) that decreases access time to the server's hard disk, improves security and offers fault-tolerant features like disk duplexing and disk mirroring. And LAN Server 3.0

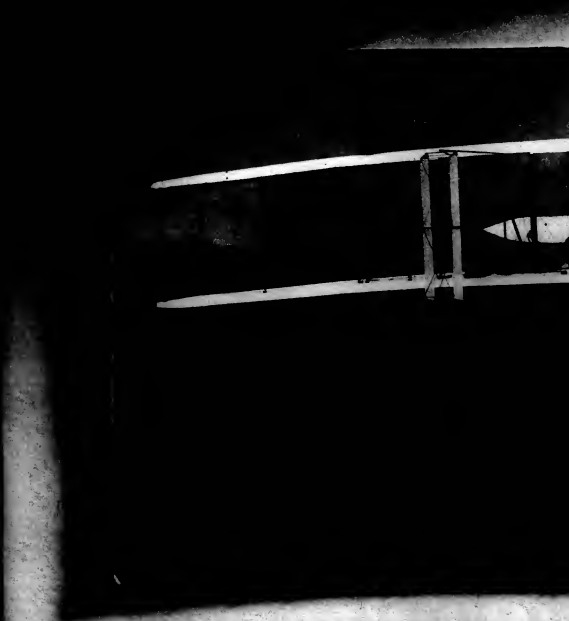
goes beyond simple resource sharing with management enhancements that are systemwide. With sophisticated local and remote system management tools for installation, diagnostics and user security, your LAN will work more efficiently with less downtime. Plus LAN Server 3.0 provides an IBM migration path to OS/2's emerging

DCE standards.

For more information, call 1 800 3-IBM-OS/2. OS/2 LAN Server 3.0 does so much more than other network operating systems, it wins by a LANslide.

™ In Canada, call 1 800 465-1234. IBM and OS/2 are registered trademarks and OS/2 Crash Protection and Workplace Shell are trademarks of International Business Machines Corporation. Windows is a trademark of Microsoft Corporation. Macintosh is a registered trademark of Apple Computer Inc.
© 1992 IBM Corp.

IBM®



EVERY ONCE IN A WHILE THE BOUNDARIES GET REDEFINED.

Alpha AXP Systems.

Now there is no telling how far you can go.

Every once in a while, something comes along that lets you do what you used to only dream about. Digital's new Alpha AXP 64-bit technology is all that and more. Its performance is amazing,



The 64-bit Alpha Chip

especially compared to systems stretched to their 32-bit limits. But for Alpha AXP technology, that's just the starting point.

It has the built-in capacity to grow a thousand times more powerful, expanding the boundaries of computing far into the future. Plus, it's unmatched for openness. You choose operating systems—UNIX, OpenVMS, and even Windows NT™ when available.



Chosen from over 15,000 applications already written, move your applications to Alpha AXP, or start creating your own 64-bit applications right now. You can even choose who you buy it from.

The technology is that open.

For gaining a competitive edge,

Alpha AXP technology is clearly where computing is going. But that doesn't mean



Alpha AXP systems range from the world's fastest desktop workstation, model 211.60A, to mainframe-class systems.

you have to wait. Alpha AXP systems are ready for immediate delivery.

To learn more, call 1-800-DECINPO ext. 762. In Canada, call 1-800-368-1121.

Or to get information by FAX, call 1-800-842-7027 in the U.S. and Canada. Or call your local Digital Representative.

digital

Links

Phonetics Corp. has introduced Collaborative PC, a wireless networking product designed for transmitting data from portable to desktop computers.

Collaborative PC allows a desktop computer to serve as a link to the wired network and as a docking station for portable

computers, the firm said. The product comprises an internal half-card for an XT/AT bus or Extended Industry Standard Architecture bus plus an external tethered transceiver. Through an aperture in the tethered transceiver, data is transmitted at 1M bit/sec.

Collaborative PC costs \$250.

► **Photonics**
2640 N. First St.
San Jose, Calif. 95131
(408) 855-7930

Gateways, bridges, routers

Chipcom Corp. has introduced the Online Token Ring Bridge Module.

The product was designed for the company's Online System Concentrator family of intelligent switching hubs. The module integrates a two-port Token Ring-to-Token Ring bridge, utilizing one slot in either a six-slot or 17-Slot Online System Concentrator, the company reported. From a single 17-slot hub, two redundant, parallel To-

ken Ring backbones can be accessed using up to 100 Token Ring users. Because the module is integrated with the Online System, features such as fault-tolerant controller modules, backup links, redundant power supplies and Chipcom's On-demand network Control System are provided.

Pricing begins at \$5,400.

► **Chipcom**
Southboro Office Park
118 Turnpike Road
Southboro, Mass. 01772
(508) 490-8800

Lotus cc:Mail delivers

The world's leading LAN-based electronic mail system, cc:Mail delivers full connectivity and transparent cross-platform communication on every level. It was built from the ground up to support network environments of different platforms and LANS—without the need for gateways. So don't worry about reaching the people you need to. Want to send text? Files? Graphics? Faxes? To Bob? Carol? Ted? Alice? With cc:Mail, you can.* Whether they're on the road or at home, whether they're on Macintosh, DOS, Windows, OS/2 or UNIX, whether they're on Banyan, Novell, LAN Manager or Appleshare, cc:Mail delivers.

Software Spectrum Prices*

cc:Mail V4.0 MS DOS Platform Pack	\$209
cc:Mail V4.0 (10 user pack)	\$249
cc:Mail V4.0 (25 user pack)	\$603
cc:Mail V4.0 (100 user pack)	\$2369
cc:Mail V1.1 Windows Platform Pack	\$349
cc:Mail V2.0 Macintosh Platform Pack	\$359

And when you're ready to purchase cc:Mail or other Lotus products, Software Spectrum delivers the finest service and lowest prices in the industry. We offer the convenience of toll-free telephone shopping. Friendly, knowledgeable salespeople who know more than just prices. Reliable technical support. And same-day shipping of orders received before 4:00 (Central). So call today and let cc:Mail deliver for you.

1-800-824-3323

from 7:00 am to 7:00 pm (Central)

SOFTWARE SPECTRUM

*Prices subject to change. All product names referenced here-in are trademarks of their respective companies.

Only
\$209 cc:Mail
Platform Pack



Network Systems and Vitalink Communications Corp. have announced enhancements to their 6900 line of high-performance bridge/routers.

The enhancements consist of new 4/16M hitless. Token Ring platforms and support for Switched Multimegabit Data Service, frame relay and X.25 link protocol. The enhancement includes new Token Ring models that will initially support IBM source routing, translation bridging between Token Ring, Point-to-Point Protocol, Vlanlink communication protocol, Ethernet and Fiber Distributed Data Interface, among others. Concurrent reduced instruction set computing-based bridging and multi-protocol routing are available on a per-port basis in a variety of fixed-configuration options, the company reported.

Pricing for the Token Ring models starts at \$9,000.

► **Vitalink**
6007 Enticer Drive
Fremont, Calif. 94555
(415) 794-1100

Compatible Systems has started shipping the RISC Router 3000E, a reduced instruction set computing-based Ethernet-to-Ethernet multiprotocol gateway/router.

According to the company, the RISC Router 3000E was designed primarily for use on local-area networks that include Apple Computer, Inc. Macintosh computers. Initially, the router will route AppleTalk, Digital Equipment Corp.'s DECnet, Transmission Control Protocol/Internet Protocol and networking protocols. Features include management software that contains extensive network diagnostics and configuration features and Advanced Network Security Protocol, a password protection feature that is used for individual AppleTalk-compatible network devices.

The product costs \$2,995.

► **Compatible Systems**
4730 Walnut St., Suite 102
Boulder, Colo. 80501
(303) 444-0532

NEED GLOBAL SALES LEADS?

Advertise in
Computerworld's
new Global
Response Cards.
Next ad close: January 25
800-343-6474
x757.

Large Systems

DEC shifts strategy

By Melinda-Carol Bullock

■ Digital Equipment Corp.'s resolution of a long-standing lawsuit with Micro Technology, Inc. last month indicates a shift in strategy that is likely to bode well for users of both firms' storage products, industry observers said.

DEC had sued Micro Technology for infringement of its Standard Disk Interconnect/Standard Tape Interconnect (SDSTI) patents in both the U.S. and Germany. The companies resolved the dispute via a joint licensing agreement and a planned phaseout of Micro Technology's SDSTI products by the end of 1993.

The resolution of what is the last of a slew of suits against third-party storage providers indicates a shift in stance for DEC.

Historically, DEC has focused on a series of proprietary interconnect protocols for storage products that it refused to license to third parties. When third parties reverse-engineered and implemented those protocols for use in competitive products, DEC filed suit against them [CW, July 6, 1992]. During the past year, DEC began offering licensing programs for its Digital Standard Systems Interconnect, Computer Interconnect and SDSTI protocols and began resolving conflicts with third parties.

The change in policy toward third-party storage providers, as well as the expected release of standard Small Computer Systems Interface (SCSI)-2-based storage subsystems for end users next month, indicate the emergence of a more open DEC, users and industry analysts said.

"We see this as a big plus for users — to be able to deal jointly with DEC and third parties like

MTL," said Peter Coriasso, vice president of technical services at Bankers Trust Co. in New York. By DEC's support of standard SCSI offers users flexibility, he added. SCSI products can be interchanged so that if you purchase a modular cabinet from one vendor you can interchange with another vendor's SCSI-based solution.

Industry analysts agreed on the advantages of "competition."

"The company will be spending less time fighting with small subsystems suppliers and more time trying to make their products easily accessible to end users," said Crawford DelPrete, a manager at International Data Corp., a market research firm based in Framingham, Mass. "I can't emphasize enough that those will not necessarily be DEC's users."

The nonproprietary nature of DEC's strategy is already obvious in DEC's push into the OEM market, which is already reaping success, according to DelPrete. "It's not necessarily MIS managers who are buying anymore — you might open up a PC and it would have a DEC disk drive in it, for instance," he said.

DEC has been pushing hard in its OEM business. In November, it released a customizable data center storage subsystem and packaged desk-side storage subsystems with redundant arrays of inexpensive disks (RAID) Level 0, 1, 3 and 5 capabilities. It also released SCSI-2 interconnects that target OEMs.

Total cabinet capacity for the modular data center storage product can include up to 168 3 1/2-in. or 48 5 1/4-in. SCSI-2-based disk or tape devices, or a mixture of the two, DEC officials said. Also announced was a RAID desk-side subsystem that can include up to 35 SCSI-2 disks in seven racks within a pedestal enclosure.

Storage Tek ships AS/400 RAID system

By Kim S. Naoi

WILKES BARRE, PA.

While Storage Technology Corp.'s longeberr mainframe-level storage system remains frozen in place, the company's midrange RAID product is out the door — just missing a self-imposed third-quarter shipping deadline.

Alpine 9600 Storage Manager, a redundant arrays of inexpensive disks (RAID) subsystem announced in April, recently shipped to select customers. General availability is planned for this month, according to a spokesman.

Site Wholesale Drug Co., one of five sites running Alpine, rejected other Application System/400 RAID systems, including the Harconix line from EMC Corp. and IBM's 8337 system, which just came out. Key previously napped only IBM-made storage devices for its AS/400s.

"There were cheaper solutions, but they didn't measure up," said Brian Nichols, MIS manager.

For example, Nichols said that the ease of disk replacement that Alpine offered and added that the disk drives in IBM's and EMC's products were not as easily accessible. Plus, because Kay is open six days a week, 24 hours a day, time is of the

essence during a failure.

IBM service was slow on Kay's older 8335 and 8332 traditional drives, Nichols explained. "And we didn't want that to become a major issue now." He said IBM field staff sometimes took "several hours" to resolve a problem, which resulted in order delivery delays in Kay's customers.

Up and running

Kay paid approximately \$250,000 for two Alpines, one of which has been running since early December. Nichols said the second system will be installed this week.

The company plans to replace its two AS/400 Model B70s, located here, and one AS/400 Model B35, located in a North Carolina office, with a more powerful Model E90 at the central office. Putting RAID in place is a key step in that consolidation. Alpine's RAID Level 5 protection ensures that "all our data is safe as we make the switch," Nichols said. The cutter is planned for early 1993.

Although Storage Tek developed the microcode for Alpine, Alpi Technologies, Inc. in Boulder, Colo., manufactures most of the hardware involved. Xb Datacomp, which Storage Tek bought out in November 1991, resells the subsystem.

CompuServe database simplifies fish-tracking task

By Melinda-Carol Bullock

Engineers at the Northwest Power Planning Council (NPPC) needed to find a way to consolidate, manage and model hundreds of thousands of slippery, disparate records located across four states — records about migration patterns of salmon.

Back in the early 1980s, Congress established the NPPC and charged it with developing a program that would mitigate the damage done by hydroelectric dams in stocks of salmon and steelhead along the Columbia River. But Congress did not give the council an easy way to centralize the data on fish counts that existed in multiple formats and locations.

"The NPPC needed to discover where the fish had gone, assess the quality of the wildlife habitat, and track new hydroelectric development. The NPPC was also charged with examining the impact of other factors inhibiting wildlife in the area, such as irrigation and logging.

"We needed to develop data management sys-

tems to take information and track it up and down different rivers and around a large number of variables — such as which species were on that river, or geological and archeological information — and then code it," said Peter Paquet, senior biological associate at the NPPC.

No shortage of data

The sheer amount of data is massive — approximately one-third of all free-flowing rivers in the U.S. are in the Columbia River drainage system, Paquet said.

"Covering information about every half mile in that area worked out to about 500,000 records," added Nora Miller, information systems manager. "And there are

monstrous numbers of records on an hydrographic data set — about 7,500 characters per record with technical engineering information about hydroelectric penstocks and dam height, with over

4,000 records."

The council also needed to develop a model to examine the effects of changes in dam operations on the fish populations. The Endangered Species Act added to the complexity because it required the agency to trace specific species of endangered salmon.

"We needed to know where they were by river reach, by hatchery release, dam count information, and we needed to be able to track the model to later what might happen if we modified a dam," Paquet said.

For several years the NPPC struggled to bring together disparate computerized data sets from fish counting stations and agencies located across Oregon, Idaho, Washington and Montana.

The NPPC had used a hydrographic of solutions that were incapable of handling the required data volumes that ranged from plain ASCII files to a

Flash, page 108



SITE

NPPC
Portland, Oregon

Challenge: To centralize disparate fish count data from four states and analyze damage caused by hydroelectric dams to wildlife along the Columbia River.

Technology: System architecture from CompuServe running on a DEC VAX, using the SAS Institute's SAS System for data analysis.

Is 'downsize or scam' your mantra?

By John Kador
RENO, NEV.

To the 2,019 attendees of the recent Computer Measurement Group (CMG) '92 meeting, the increasing deployment of new client/server and Unix applications has created intense interest in the ability to

measure, model and forecast the performance of local-area networks and other distributed systems.

Attendees caught CMG organizers by surprise as they consistently oversubscribed the technical sessions devoted to Unix and client/server topics. Traditional host-oriented capacity planners have been

put on notice by their managers that they will now be responsible for deploying downsized and distributed systems.

"I have six months to learn this stuff or I'm out," said a longtime CMG attendee who asked not to be named.

Nor will the learning curve be easy. "Client/server computing requires tremen-

dous network services and emphasizes measurement of cross-memory database servers like DB2. In short, client/server computing stresses everything we are worst at," said H. Pat Artis, president of Performance Associates in Palm Desert, Calif.

"Under Unix, people will have to rethink every paradigm of performance engineering," agreed Bernie Wong, senior systems engineer at Systemhouse Ltd. in Okawa. One new paradigm, Wong said, is for application developers to test the performance of program de-

signs before, not after, they write code.

Giving up old paradigms will be hard, predicted Bernate Domanski at Domanski Sciences in Englestown, N.J. "Many traditional capacity planners have little concept as to what cooperative processing means and how the split — where some work is done on the server and some on the host — is organized. The temptation will be to take the techniques they know and apply them to client/server systems," he said.

The risks are serious, Domanski added, because the results of traditional performance analyses cannot be relied on when applied to distributed systems. "The Fortune 1,000 is going to rely on traditional capacity planners when it approves procurements for client/server machinery."

As organizations migrate applications to distributed, multivendor environments, they will need enterprise-wide performance-monitoring tools that manage and control performance factors for hosts, clients, servers and networks from one location, according to attendees. These systems will need to control applications through a management-by-exception process that warns of potential problems and corrects them.

Most of all, these systems must encompass the hardware and software of different vendors and different operating systems. Hewlett-Packard Co.'s PerfView, for example, offers Unix users the opportunity to manage heterogeneous networked environments from a global perspective.

HP demonstrated how PerfView consolidates performance information from agents sitting on network nodes. Applying a management-by-exception strategy, the agents look for conditions that meet predefined thresholds.

Companies that wanted to be certain, for instance, that at least four users could always be added to a network without degradation could program the network to report when upgrades are indicated. The first release of PerfView runs on HP 9000 systems under HP/UX. Later releases will support Sun Microsystems, Inc. SPARCstations and IBM RISC System/6000s.

Kador is a free-lance writer in Geneva, Ill.

The spotlight is on

IBM's E/ES3
can help you have successful
client/server and the company,
IBM, isational."

J.V. Harrison
IBM Corporation
Enterprise Systems Director of the
Mid-Hudson Valley Programming Laboratory

"An IBM team evaluated the (E)ES3 product, comparing it against available solutions and found (E)ES3 to best meet our customer requirements, as defined by the various user groups. (E)ES3 user experiences, as reported at SHARE and GUIDE, show enthusiastic reception for its functionality, software code quality, product design and vendor support."

PHOENIX



Is your global network giving you a competitive advantage?

Or giving it away?

Outsourcing with Syncordia can help you get ahead of the competition.

Getting the right information to the right people at the right time can give you an edge over the competition. If your competition does it better, they'll have an edge over you.

To help swing the odds in your favor, you need a partner. A partner who knows as much about managing global networks as you do about making cars, drilling for oil, running airlines, or whatever you do.

Outsourcing with Syncordia lets you do what you do best.

Syncordia has a better way to manage your global network. Outsource it with us.

Outsourcing gets you out of the business of building and managing global networks and allows you to redeploy people and assets against the business your company was formed to pursue in the first place.

With us as your partner, managing complex global networks isn't so complex, because that's the business we were formed to pursue.

Most important, to us, partnership means pursuing opportunities, not just solving problems. We'll make it our business to know your business and help you use information technology to get an edge over the competition.

We're part of BT.

Syncordia is the first company built from the ground up to provide global network outsourcing solutions.

We are part of BT (British Telecom), one of the world's largest and most advanced telecommunications companies. So we have access to the worldwide resources, technical prowess and local market knowledge of our parent company, and retain the entrepreneurial ability to customize solutions for your business.

Not just the first, but the finest.

Syncordia outsourcing solutions range from planning and integration through procurement, installation and maintenance to the operation of your entire network.

In all cases, we guarantee the highest level of customer service through Network Control Centers, armed with Concert™ network management software; Customer Support Centers, staffed with multilingual, multicultural managers; and integrated Single Currency Billing.

The Syncordia Service Level Agreement spells out every detail of what you can expect from our partnership. It defines the shared risks and rewards.

Call us, before your competition does.

Outsourcing your global communications network takes time. And teamwork. All the more reason to begin right away. Because if you don't get ahead of your competition, they'll get ahead of you.

For more information on Syncordia, in the U.S. or Canada, call 1-800-477-5355.

SYNCORDIA

Let us help you mind your business.

Syncordia is a subsidiary of British Telecommunications plc.





Maryfran Johnson
Senior Editor Workstations

Mark Halper
Senior Correspondent

Jean Bozman
Senior West Coast Editor

RELENTLESS, DETERMINED, COM

Relentless in the pursuit of the latest breaking news in IS.

Determined to dig deeper and work harder to uncover the stories that matter most to you.

Committed to the highest standards of excellence and integrity in journalism.

Focused on bringing you the IS information you need to know, when you need to know it.

Driven to cover it all — PCs, workstations, mainframes, client/server computing, networking, communications, open systems, languages, and more.

These are the qualities that distinguish the editors, writers, designers, and production staff of *Computerworld*. And they are the reason *Computerworld* is the newspaper of IS.

Week in and week out, the people at *Computerworld* cover the world of IS in greater depth and breadth than any



Joanie M. Wexler
Senior Editor Networking



Alan Alper
News Editor

MITTED, FOCUSED, AND DRIVEN.

other publication. That's why over 137,000 IS professionals pay to subscribe to *Computerworld*. Shouldn't you?

Subscribe to *Computerworld* today and you'll receive 51 issues packed with everything you need to know to do your job better. And get an edge on the competition. Plus, you'll get our special bonus publication, *The Premier 100*, an annual profile of the leading companies using information systems technology.

Order today by calling us toll-free at 1-800-343-6474. Or use the postage-paid subscription card bound into this issue. And get your own copy of *Computerworld*.

Then you'll see how a few relentless, determined, committed, focused, and driven people can make a difference.



The Newspaper of IS

Database eases fish-tracking task

CONTINUED FROM PAGE 109

database from the University of Washington dubbed UW90m, which was oriented toward mathematical applications, according to Miller. The group finally opted to standardize on a 1032 database management system from CompuServe Data Technologies running on a Digital Equip-

ment Corp. VAX 4300.

Paquet listed several reasons for the decision. System 1032 was able to read information provided in different formats by agencies counting the fish in other states. In some cases, the data had to be transformed by multipliers to determine feet per

mile as opposed to feet per acre, for instance. System 1032 bridged the gap between the different data sets by mapping oddball data sets to standard data sets.

"One thing that made our lives miserable was that each state had already developed different numbering systems for coding their streams — System 1032 helped us to develop cross-referencing systems for the EPA code we were using," Paquet said.

System 1032 allowed the NPFC to incor-

porate very large records and multiple data sets, including engineering formats, and the programming language is straightforward and easy to use, which allows end-users to create their own applications and saves Miller time.

Protected areas

In conjunction with the SAS System from SAS Institute, Inc., the agency can analyze the necessary information to help set up protected areas where hydroelectric dams cannot be built. While hydroelectric developers use the information to plan projects, biologists use it to repair damage to the fish habitat.

"We have been using this data to [find out] how many fish there are, where the real problems are and to try to come up with a classification of problems which damage fish runs," Miller said. "We cross-reference to data sets to determine where people have applied for or received licenses for dams and decide where to allow them."

Paquet said the new system will allow the NPFC to prescreen proposed dam projects to identify and help prevent major environmental problems in the future. She added that the NPFC has just completed a menu system for the database that will allow people who are not computer-literate to enter and access data easily.

Silicon Ecology



It's Tax-Deductible

Instead of thinking of your company's used PCs, printers, modems, and other computer products as used up, consider them *reusable*. That's Silicon Ecology, and it makes sense all the way around.

The East West Foundation takes your surplus equipment and distributes it to American schools and colleges and to democratic and educational institutions in Eastern Europe, the Commonwealth of Independent States, and Latin America—wherever it can make a difference. And it does make a difference.

Donating used or overstock computer equipment to the East West Foundation can make a difference to you, too—at the bottom line. Because all donations are tax-deductible.

To find out more about Silicon Ecology or arrange for a donation, please call:

East West Foundation
49 Temple Place, Boston, MA 02111
(617) 542-1234 Fax (617) 542-3333
A Not-For-Profit Corporation



Software Partners offers Unix backup to VAXs

By Melinda-Carol Ballo
TOPSFIELD, MASS.

Software Partners/8, Inc. recently began shipping ThruNet, an automated tape backup and restore facility for Unix workstations. ThruNet can be combined with Software Partners' TapeVMS VAX/VMS tape management system to provide joint management of Unix and VMS backup and library functions.

"How can schedule backup for Unix workstations and back them up to a VAX using local backup [facilities]," said Phil Jamieson, president of Software Partners. "Lots of people have asked us for this because they are running mixed environments."

The product also offers American National Standards Institute label control to more easily manage and control the backup tapes, he added.

No special knowledge of VMS is required because ThruNet is operated with standard Unix commands, according to the vendor. ThruNet features individual file and full-disk backup and restore, which offers greater security by eliminating local tape devices on workstations and directing backups to a central VAX, company officials said.

ThruNet supports VAX servers running TCPware or Multinet Transmission Control Protocol/Internet Protocol with client workstations running SunOS V4.0.1 or Ultrix V4.1. Prices range from \$2,500 to \$12,500, depending on configuration.

Large Systems

Software application packages

WorksRight Software, Inc. has announced Estimate Master and Work Diary software systems designed for the IBM Application System/400.

According to the company, Estimate Master can classify expenses and produce the simplest or most complex estimates. Because the product is a multitier system, it can be used to simultaneously work on up to 999 estimates. Work Diary keeps a daily diary of user activities. Up to 999 lines of text can be entered by individual users, and the number of users who can access the system is unlimited. Work Diary also provides built-in security.

Estimate Master and Work Diary cost \$199 each.

► **WorksRight Software**
895 Madison Ave.
Madison, Miss. 39110
(601) 456-5337

Artech Software, Inc. has released Version 2.0 of Sniper for Digital Equipment Corp. VAX/VMS.

Version 2.0 monitors available disk space and manages idle processes on VAX/VMS systems. An enhancement to the product is the ability to create multiple configuration files to modify Sniper's operation during various times of the day or week or different nodes within the VAX-cluster, the company reported.

Sniper license pricing ranges from \$495 to \$2,195.

► **Artech Software**
Suite 500
19800 MacArthur Blvd.
Irvine, Calif. 92715
(714) 957-1978

Anderson Consulting has released DCS/Logistics Version 11.0 for the IBM mainframe.

The product is a modular software solution designed to help users better manage customer service and logistics activities. According to the company, this version features expanded multinational capabilities to improve competitiveness in global markets.

Through a Customer Returns module, DCS/Logistics Version 11.0 provides immediate no-line authorization and receipts and confirmation control steps. Fully integrated with the Warehouse Management, Order Processing and Promotions and Deals modules, the Customer Returns

module also offers flexibility in returns policies, including returns pricing, maintenance and inspection.

Pricing for Version 11.0 begins at \$300,000.

► **Anderson Consulting**
69 West Washington St.
Chicago, Ill. 60602
(312) 580-0069

Security Dynamics, Inc. has introduced Version 2.0 of ACM/5100.

According to the company, "CM/5100 positively identifies Digital Equipment Corp. VAX/VMS system users, which allows only authorized personnel to access corporate information resources.

ACM/5100 Version 2.0 was designed to receive the benefits provided by the security procedures within DEC's VMS 3.5 operating system.

Different levels of authentication security can now be controlled for authorized users logging into the system. Users have

the option of choosing several authentication and identification factors such as the VMS password, the VMS user identification or a personal identification number that is used with a random code on Security Dynamics' SecurID card.

Prices start at \$7,500.

► **Security Dynamics**
1 Altriville Center
Cambridge, Mass. 02140
(617) 547-7800

New products, page 110

*The fact is, our Computerworld
IDC White Paper was read by the
most powerful IT leaders in the world.*



"At the Open Software Foundation, we believe freedom means not having to stay inside a box—that someone else created. Which, of course, is the very concept of open systems: the freedom to choose."

"The OSF believes that interoperability is becoming recognized as increasingly important in the growing open systems marketplace. Our White Paper on 'Interoperability: Cornerstone of Open Systems' was designed by IDC to educate the IS marketplace on the terms 'interoperability' and 'open systems.'"

"The Computerworld White Paper Program helped us accomplish our objectives by educating information systems management, the most important buying influence in the market today, on how to make open systems a reality."

Ann Dulaymple
Manager of Publications
The Open Software
Foundation



HOW TO SELL USED EQUIPMENT.

Advertise in Computerworld's
Classifieds. They work.

800-343-6474

x744

THE COMPUTERWORLD WHITE PAPER PROGRAM
An innovative program for selling your technology solutions

375 Elm Street, Boston, MA 02101-9111
(508) 552-1000

Large Systems

CONTINUED FROM PAGE 109

Raxco, Inc. has released Version 4.0 of PerfectCache, its automatic data caching and virtual disk package for enhancing I/O performance on Digital Equipment Corp. VAX/VMS systems.

According to the company, new proprietary techniques enable PerfectCache Version 4.0 to extend beyond past versions by maximizing the percentage of disk I/O requests that can be fulfilled from memory

as opposed to slower, physical disk access.

Features include "instant caching," "look-ahead caching" and "every I/O" memory-management techniques. All VAX/VMS applications are supported.

PerfectCache costs between \$250 and \$8,750, depending on VAX system type.

► *Raxco*

Suite 2000

2440 Research Blvd.

Rockville, Md. 20850

(301) 558-2920

Data storage

XI/Datacomp, Inc. has announced the XI/Datacomp 9637 Model 002 Disk Array Storage Subsystem.

The product was designed for the IBM Application System/400 and the System/38.

The 9637 offers four to eight physical drives and incorporates 3 1/2-in. Head Disk Assemblies. The subsystem has a total capacity of 3.6G to 6.9G bytes and features a

mean time between failure rate of 400,000 hours.

An optional outboard redundant arrays of inexpensive disks-1 architecture is offered for increased data availability and protection.

Prices start at \$34,200.

► *XI/Datacomp*

903 N. Elm St.

Hinsdale, Ill. 60521

(708) 323-1200

Acknowledge, Inc. has introduced the Alcor family of optical storage subsystems.

The subsystems were designed for all IBM Application System/400 models. Because they are software-driven, users can implement image applications or innovative data for large quantities of on-line information such as point of sale, fax and database applications.

Coded and noncoded data can be handled by the high-end Alcor 7905-140. Up to 2T bytes of rewritable media can be stored on the 7905-140. The entry-level 4905-032 can handle imaging applications and will show up to 20G bytes of write-once read-many data.

Prices range from \$30,500 to \$125,000.

► *Acknowledge*

255 W. Central St.

Natick, Mass. 01760

(508) 650-3620

Exide Electronics Group, Inc. has announced New Powerware-Plus 6 Back-mount Uninterruptible Power Systems.

According to the company, the system provides shield-sensitive electronics from power disturbances and offers clean, reliable power to critical applications such as telecommunications, modular data processing systems, mobile applications and laboratory and manufacturing equipment.

Customer-configurable, I/O voltage is offered as well as phase and frequency with single-keypad control. Other standard features include bypass plus, emergency power off, digital front panel display and an RS-232 serial port.

Pricing begins at \$8,065.

► *Exide Electronics Group*

8531 Six Forks Road

Raleigh, N.C. 27615

(919) 872-3620

Emerald Systems has released the Emerald Systems Digital Audio Tape (DAT) Autoloader.

Up to 960 bytes of data in a desktop can be stored using a magazine of 12 DAT cartridges, the company reported. Complete unattended backup and storage management is also provided.

The 4thm DAT Autoloader works with the company's Microsoft Corp.'s Windows-based Xpress Librarian 2.0 software by attaching to the network managers workstation where Xpress Librarian is installed. Available Novell, Inc. NetWare servers can then be backed up to the Autoloader's drive. When used with an optional software module, local hard disks can also be backed up.

The DAT Autoloader costs \$12,965.

► *Emerald Systems*

12530 World Trade Drive

San Diego, Calif. 92128

(619) 673-2181



Guess What's Missing In Our Competitor's Warranty.

Choose anything but a CIE America line printer and you'll be missing on-site warranty service. Which means your printer will also be missing—for who knows how long—while it's being repaired. In a high-volume business like yours, that equates to a major gap in productivity.

The CIE America warranty not only provides free on-site service for the first year, it covers more than most. Every nut. Every bolt. Virtually everything.

Our rock-solid line printers feature lightning-quick 540 to 940 lpm throughput, and our entire family

of business printers is fully compatible with popular network interfaces and emulations. All this at one of the industry's lowest costs of ownership.

When your line printer goes down, productivity is sure to follow... unless you've got CIE America's on-site warranty. Call and discover what you've been missing. (800) 877-1421, ext. 4494



CIE
America, Inc.

© 1992 CIE America, Inc. All copyrights and trademarks acknowledged.

More Application Development!

51 Issues for ~~\$48~~ ^{NOW} ONLY \$38.95

Yes, I want more. I accept your offer of \$38.95* for 51 weekly issues. That's a savings of over \$9.00 off the basic subscription rate. Plus, I'll also receive my Desktop Calculator FREE with my paid subscription.

PCCode 97

First Name _____ MI _____ Last Name _____
 Title _____ Company _____
 Address _____
 City _____ State _____ Zip _____
 Address shown: ☐ Home ☐ Business ☐ New ☐ Renew Basic Rate: \$48 per year
 *U.S. Only Canada \$74.97, Central/South America \$130, Europe \$195, all other countries \$295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information below to qualify for this special rate.

1. BUSINESS/INDUSTRY (Circle one)

- 14. Manufacturer (other than computer)
- 15. Professional/Service/Trade
- 16. Wholesale/Retail Trade
- 17. Business Service (except CP)
- 18. Government - State/Federal/Local
- 19. Communications System/Postal/Utility/Transportation
- 20. Mining/Construction/Healthcare/Religious/Ag.
- 21. Manufacturer of Computers, Computer Peripherals or Peripherals
- 22. System Integrator, VAR, Computer Service Bureau, Software Planning & Consulting Service
- 23. Computer/Peripherals Dealer/Client/Reseller
- 24. Other _____

(Please specify)

2. TITLE/FUNCTION (Circle one)

- 25. Chief Information Officer/VP President/Exec. VP
- 26. VP/Manager
- 27. Director/Manager, Information Center
- 28. Director Tech. Planning, Admin. Serv., Data Comm.
- 29. Network Sys. Mgr., LAN/Mgr., PC Mgr.
- 30. Director Sys. Development, Sys. Architecture
- 31. Programming/Management, Software Development
- 32. Engineering, Software, Field Tech. Mgr.
- 33. Sys. Integrator/Video/Consulting Mgr.

CORPORATE MANAGEMENT

- 34. President, Chief Executive, General Mgr.
- 35. Vice President, Asst. VP
- 36. Treasurer, Controller, Financial Officer

COMPUTERWORLD

PCs in short supply



FREE GIFT

DEPARTMENTAL MANAGEMENT
 37. Sales & Mktg. Management
 38. Shipping, Legal, Accounting Mgr.
 OTHER PROFESSIONAL MANAGEMENT
 39. Managing Journalists, Librarians, Students
 40. Other Title/Personnel

3. Does your job function require involvement with your company's or your client's computer information systems/data processing communications systems?
 (Please check only one)
☐ YES ☐ NO

E43015-7

More Enterprise Networking!

51 Issues for ~~\$48~~ ^{NOW} ONLY \$38.95

Yes, I want more. I accept your offer of \$38.95* for 51 weekly issues. That's a savings of over \$9.00 off the basic subscription rate. Plus, I'll also receive my Desktop Calculator FREE with my paid subscription.

PCCode 97

First Name _____ MI _____ Last Name _____
 Title _____ Company _____
 Address _____
 City _____ State _____ Zip _____
 Address shown: ☐ Home ☐ Business ☐ New ☐ Renew Basic Rate: \$48 per year
 *U.S. Only Canada \$74.97, Central/South America \$130, Europe \$195, all other countries \$295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information below to qualify for this special rate.

1. BUSINESS/INDUSTRY (Circle one)

- 14. Manufacturer (other than computer)
- 15. Professional/Service/Trade
- 16. Wholesale/Retail Trade
- 17. Business Service (except CP)
- 18. Government - State/Federal/Local
- 19. Communications System/Postal/Utility/Transportation
- 20. Mining/Construction/Healthcare/Religious/Ag.
- 21. Manufacturer of Computers, Computer Peripherals or Peripherals
- 22. System Integrator, VAR, Computer Service Bureau, Software Planning & Consulting Service
- 23. Computer/Peripherals Dealer/Client/Reseller
- 24. Other _____

(Please specify)

2. TITLE/FUNCTION (Circle one)

- 25. Chief Information Officer/VP President/Exec. VP
- 26. VP/Manager
- 27. Director/Manager, Information Center
- 28. Director Tech. Planning, Admin. Serv., Data Comm.
- 29. Network Sys. Mgr., LAN/Mgr., PC Mgr.
- 30. Director Sys. Development, Sys. Architecture
- 31. Programming/Management, Software Development
- 32. Engineering, Software, Field Tech. Mgr.
- 33. Sys. Integrator/Video/Consulting Mgr.

CORPORATE MANAGEMENT

- 34. President, Chief Executive, General Mgr.
- 35. Vice President, Asst. VP
- 36. Treasurer, Controller, Financial Officer

COMPUTERWORLD

PCs in short supply



FREE GIFT

DEPARTMENTAL MANAGEMENT
 37. Sales & Mktg. Management
 38. Shipping, Legal, Accounting Mgr.
 OTHER PROFESSIONAL MANAGEMENT
 39. Managing Journalists, Librarians, Students
 40. Other Title/Personnel

3. Does your job function require involvement with your company's or your client's computer information systems/data processing communications systems?
 (Please check only one)
☐ YES ☐ NO

E43015-7

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BILL GATES WANTS TO SHAKE YOUR HAND.

But first you'll have to win the 2nd Annual WINDOWS WORLD Open,
Computerworld's Custom Application Contest
at WINDOWS WORLD '93 in Atlanta, May 24-27.

"So you think your custom Windows[®] applications look pretty good?"

Then show the world at the 2nd Annual WINDOWS[®] WORLD Open.

If your custom application wins, you'll join Bill Gates at an awards ceremony and private reception in your honor.

In fact, if your entry is one of those selected, we'll pay for all necessary equipment to be shipped to WINDOWS WORLD to demo your winning application, and you'll receive free admission to the conference and the exhibit.

And finally, you and your company will be featured in Computerworld. How's that for instant fame and fortune?

Here's what our WINDOWS WORLD Open Winners will look like.

We're looking for innovative applications made possible by you and Windows.

For instance, maybe you created an

executive information system, or a field sales office reporting system, perhaps you downsized a host application, or wrote a mainframe-to-micro user access system.

Enter it!

Do you have the Qualifications?

Your entry should be a custom program currently in use (not a prototype), and not for resale.

It should also be either an entirely new application, a modification of an off-the-shelf application, or a Windows front-end for a host application. And of course, it should require Windows.

Entries will be accepted in the following eight industry categories: 1) Manufacturing, 2) Finance, 3) Insurance/Real Estate, 4) Transportation/Communications/Utilities, 5) Services/Professions, 6) Wholesale/Retail/Distribution, 7) Government/Public Administration, and 8) Other.

Call for Entry.

Just call the WINDOWS WORLD Open Hotline toll-free at 1-800-829-4143, or 1-206-443-3329 to request your official WINDOWS WORLD Open entry kit.*

The deadline for entry is Midnight, February 15th, 1993.

But hurry. The first 200 entries receive a free WINDOWS WORLD Open T-Shirt.

So call now. Because the competition is right around the corner. And Bill is looking forward to meeting you.

Sponsored by:

COMPUTERWORLD
The Newspaper of 5

Microsoft[®]

WINDOWS WORLD

*The WINDOWS WORLD Open Entry Kit contains all details, rules and guidelines for this contest. Contest rules subject to change without notice. *Purchase necessary. ©1993 Computerworld, 175 California Road, Fremont, WA 97731-4777, 509-476-0788, fax 509-476-0444. An IDE publication. Computerworld is a trademark of C.W. Publishing Inc. Microsoft is a registered trademark and Windows is a trademark of Microsoft Corporation. WINDOWS[®] WORLD Conference and Exposition and WINDOWS[®] WORLD Open are properties of INTERACTIVE GROUP, INC., NEVADA, Inc.

system that gives you the flexibility to build and implement high performance applications independent of platforms and database systems. It even lets you deploy any application in both multi-user and client/server environments. But don't just take our word for it. Listen to a source far more convincing. Your peers.

Call 1-800-4-PROGRESS for survey results or a test drive.

forms and database systems. It even lets you deploy any application in both multi-user and client/server environments. But don't just take our word

PROGRESS applications are fully portable across the broadest spectrum of hardware platforms, operating systems, network protocols and user interfaces. So many, in fact, that we had to list them here in small type: **AT, CTOS, OS/2, NOVELL, IBM, OS/1, OS/3, OS/400, UNIX, ULTRIX, VMS, SERNIX, MICROSOFT, WINDOWS, SYNONDS, DECNET, LAN MANAGER, NETWARE, NOVELL, NET/XT, TPC and IBM APTC v. 6.1.** Also, PROGRESS runs in the "process architecture" in other databases, including **ADAPCO, C/GRAPH, C/GRAPH, ORACLE, Rdb, and zms**.

Middleware eases app development

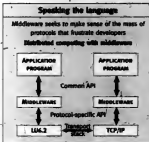
By Gary H. Antles

If terms such as Transmission Control Protocol/Internet Protocol, Systems Network Architecture (SNA), LU6.2, NetBIOS and SPX leave you a bit dizzy—but you still have to get that new distributed application up on time—you may be a prime candidate for network "middleware," a relatively new kind of software that experts say can take much of the pain out of client/server and peer-to-peer computing.

Middleware is a layer of software that fits between the application and the network. It takes messages or requests from the application and transparently routes them wherever necessary on the network, doing the appropriate protocol translations and returning data or control information to the user.

The more advanced products may also help the user with security, error recovery, directory services and a host of other functions.

According to middleware expert Max Doligow, director of enabling technologies at Tucker/Del-



Rever Technologies, Inc. in South Norwalk, Conn., the market for middleware products will skyrocket from \$50 million this year to more than \$1.2 billion by the year 2000.

With middleware, application programmers write code in conformance with a relatively sim-

ple, unchanging application programming interface. They do not need to know about protocols or network topology, and they do not have to worry, for example, that today the accounts receivable database is on an IBM mainframe but next week it may be on a Unix server.

The Centers for Disease Control (CDC) in Atlanta recently installed a middleware product from Software AG of North America, Inc. called Entire Net-Work. It allows users on Novell, local area networks to transparently access, via a standard graphical user interface developed by CDC, data from Software AG's Adabas, SAS Institute, Inc.'s SAS databases or flat files on an IBM Enterprise System/9000 series mainframe.

That used to be done by 3270 emulation and was time-consuming and error-prone, said Dan Rosen, programmer/analyst at CDC. Whenever anything was changed in the mainframe environment, the process quit working, he said.

Now, requests for data flow transparently over Novell's NetWare to the server, then over SNA. *Middleware, page 114*

At a glance

Experts say application developers may spend 30% to 40% more time writing distributed applications if they don't use middleware.

The market for middleware products will skyrocket from \$50 million this year to more than \$1.2 billion by the year 2000, according to Max Doligow, director of enabling technologies at Tucker/Del-

Planning for the future

Object Management Group reaches consensus

By Gary Ray

What is the truth behind object-oriented computing? To hear it from some quarters, objects will soon inherit the earth, and not a single line of procedural code will be left anywhere.

Even though the hype may be a bit dense, let us mention prematurely, the battle plan for an object-oriented future is beginning to come to light.

Led by the Object Management Group (OMG)—the Framingham, Mass.-based consortium of nearly 250 computer-industry vendors and a smaller number of "end-user members"—object-oriented adherents are beginning to rally around a handful of specifications that are just now coming to fruition, and for good reason, according to OMG President Christopher Stone.

"If your business practice has something to do with globalization, the concept of object technology is going to cross your path," Stone said. "It's going to hit you in the face."

Grand plan

In recent months, the OMG released its Object Management Architecture Guide, which details the OMG's grand scheme for an object-oriented

computing environment. In addition, two OMG members—HyperDesk Corp. in Westbury, Mass., and Petrotechnical Open Software Corp. in Houston—have announced products based on the OMG's Common Object Request Broker Architecture, which allows objects to communicate and interact over a variety of networks and computing platforms.

Stone, who founded the OMG nearly four years ago with members such as Data General Corp., Hewlett-Packard Co., American Airlines and Sun Microsystems, Inc., claimed that the standards-making activities of OMG are different from those of other standards groups, such as the American National Standards Institute.

"We've been concentrating on the application problem, not on the operating system and not on databases," he said. "We care about providing a higher level interface to write applications independent of the OS or database platform."

That, of course, appeals to the tra-

ditional joiners of standards organizations: the computer industry itself.

"Vendors believe they have to be members of any standards committee that comes along," said Hugh Bishop, a software analyst at the Aberdeen Group, an industry consultancy in Boston. The reason?

"Like any commercial enterprise, we view the activities of the OMG as a prudent, commercial basis."

Object technology is "going to hit you in the face."

Christopher Stone

OMG president

said Lotus Development Corp. Senior Vice President K.C. Brannan.

However, while the preponderance of vendors can lead to technical strides and market impact, "one of the things that impedes is that the vendor gets focused on technology," said Jim Silkenolter, director of systems development at Kashi-Kary Rod Stores, Inc. in Tampa, Fla. "The business community wants to solve problems in business terms."

Silkenolter, an avid user of object-oriented technology, is a member of the Forum for Distributed Ob-

ject Computing (FDOC), an informal, IS-member association represented by companies such as DHL Airways, Inc., Citibank NA, US West, American Airlines, The Boeing Co. and Electronic Data Systems Corp.

According to Silkenolter, the FDOC delivered to the OMG in early December the suggestion that OMG begin to focus on issues such as the definition of "object-oriented," the cultural and business implications of the technology and the role of object-oriented programming languages in the public domain. Straining a cooperative role, Silkenolter said, "Having a lot of user input really will help the OMG."

Sharing their concerns

Other OMG "end-user members," a special category of OMG participants, agreed that informing the organization of their own concerns is as important as monitoring the state of the art.

"We joined so that we can take this into account in our long-range planning," said an attendee from one international company. However, "the second benefit is actually to affect the direction of OMG." He added that at a recent meeting "users set the direction on security."

"We want to provide our requirements and needs to the OMG," said Denise Lynch, a computer systems specialist at United Technologies Corp. in East Hartford, Conn. "And we want to stay abreast of the technology as it evolves," she added.

The Object Management Group

Charters To promote the theory and practice of object-oriented technology.

Members More than 250 vendors and users.

Major efforts

- Object Management Architecture Guidebook for OMG's distributed object computing environment.
- Common Object Request Broker Architecture.
- Interchangeable through which objects reside and resources reside and interact.

Middleware eases app development

CONTINUED FROM PAGE 113

LU82 to the mainframe and back again without the user being aware of the intermediate steps. "All they know is they send it off into the void and answers come back," Rosen said.

The middleware also does error-checking and generates return codes that can be used for automatic recovery. Rosen, a communications specialist, said he now gets fewer telephone calls from work in the middle of the night.

Mature middleware products have not been long on the market, and momentum to use them is just beginning to build, analysts said. "Most use of middleware so far has been for read-only access for decision support," said Tony Percy, vice president

for software management strategies at Gartner Group, Inc. "It's the Type-A users that are really deploying it at the moment. It will become much more common as we see the distributed function model become the dominant one."

One Type-A middleware user is United Airlines, which uses Communications Integrator from Covia Technologies to allow users to navigate easily among a Unisys Corp. proprietary network, the Apollo reservation system's proprietary network, an

IBM SNA network and a Digital Equipment Corp. DECnet. Users retrieve data and process transactions across this internet, according to Don Karmazin, vice president of MIS.

"If you didn't have [middleware], it would be terrible," Karmazin said. "It would be much more expensive from a programming standpoint. We wouldn't have the connectivity we have now, and in the Apollo environment, we would be very limited in how we can grow the system."



Attend and Receive:

- IBM OS/2
- Beta version of IBM C++ S/2
- IBM LAN Software
- IBM Communications Manager
- Lotus Product Graphics
- Computer Associates CA-REALLY
- And more...

GO WEST!
Explore the Bolded New Computing Frontiers at the Exciting

OS/2

TECHNICAL INTERCHANGE

Introducing

IBM LAN SYSTEMS

February 28-March 3, 1993
Pointe Hilton at South Mountain
PHOENIX, ARIZONA

OS/2 The POWER of the Future ... NOW
Registration fee is \$595 if received by January 15, 1993. After January 15, fee is \$695.
For Information or to Register, Call OS/2 Technical Interchange Hot Line:
1-800-GET-OS20

(1-800-438-6720 in USA & Canada) • Outside USA & Canada call 1-203-261-6227
IBM and OS/2 are registered trademarks of International Business Machines Corporation. © 1992 IBM Corporation.

Two choices

Network middleware usually employs one of two fundamental approaches — remote procedure calls (RPC) or message passing. RPCs act a bit like traditional third-generation language subroutines calls, except the calls go out over the net. The requesting application waits for a reply.

RPC-based middleware products include offerings from Hewlett-Packard Co., the Open Software Foundation, Netware, Inc., Digital Equipment Corp., Sun Microsystems, Inc., Horizon Strategies, Inc. and IBM.

Managing middleware operates asynchronously: It sends a message to another program but does not wait for a reply if any. In addition to managing diverse network protocols, messaging-based products also sometimes perform other functions for the user, such as guaranteed or deferred delivery of messages, error recovery, alternate path routing and automatic data translation.

Products from Software AG of North America, Covia Technologies, IBM, DEC and PeerLogic, Inc. employ message passing. Legent Corp. recently announced it will incorporate PeerLogic's Pipes technology in its products for distributed computing.

Each of the two approaches has advantages and disadvantages, said Alex Delgoff, director of enabling technologies at Tuxton/Dallmeier Technologies. RPCs are easy to use and are appropriate for most client/server applications, but their synchronous nature means the application waits until a request is completed, he said.

Managing requires more communications expertise, Delgoff said, but it is a better approach for peer-to-peer computing, in which multiple, loosely coupled applications exchange information. In addition, it is possible to implement RPC with a messaging product but not the reverse.

Delgoff predicted that large, sophisticated users will move from the client/server model to peer-to-peer systems using messaging middleware. — Gary H. Ambler

When was the last time a great inventor asked for your opinion?



Okay. You're a smart person. But time and again, nobody asked what you thought. And in the end, perfect or imperfect, you just had to make the best of it because that's the way the world works. Right?

Nope.

We're asking for your opinion about Object Technology. And, what's more, we're actually listening to what you say. Now. Before our Object Management Group (280 of the highest octave minds from every single respectable software and computer company in the world) gets down to the business of creating standards for OT products.

That means speak now, and get your way. Seriously, we could really use your frankest end-user opinion.

OMG

OBJECT MANAGEMENT GROUP

The architecture and interfaces we adopt would be smarter, faster and a lot more usable. Besides, think what you could tell the grandkids.

Get as involved as you want with OMG. Fax us at 508-820-4303.

SEND ME: First Class, our newsletter (\$40/yr), *The OMA Guide*, our architecture (\$50/ea), CORBA, technical specs on messaging interface (\$50/ea).

TEACH ME: Please give me the list of OMG authorized seminars and training.

GIVE IT TO ME, FREE: Call 1-800-486-9808, Ext. 100 for a list of pertinent documents.

LET ME IN: I'm interested in becoming an OMG member. Send me some background.

Tool puts logic back in older databases

By Kim S. Nash
CHICAGO

Database programs with only shreds of documentation can be holed to maintain, never mind incorporate into new computing schemes such as client/server systems. Popkin Software & Systems, Inc. recently

joined the re-engineering fray with a tool to analyze and reconstruct the logic behind old database applications.

SA Reverse Data Engineer is an add-on module to Popkin's System Architect, a PC-based computer-aided software engineering (CASE) workbench. The product, due to ship in this year's first quarter, helps

build entity-relationship diagrams and reusable data dictionary entries out of existing database schema.

That means a database administrator can import tables, macros and other database program functions into Popkin's tool and break that information down into discrete components. The tool then figures

Summary

Entity-relationship diagrams are shown showing the data structure of an application and how each element affects others.

Data dictionary is a set of definitions of data fields and elements, their domains and processes used in an application.

out how the parts fit together and what functions they are supposed to accomplish, according to Ron Scherma, Popkin's president.

Entity-relationship diagrams and other maps showing application logic are then captured in Popkin's System Architect workbench and can be incorporated into future CASE-based applications built with System Architect, Scherma said. System Architect runs under Microsoft Corp.'s Windows and IBM's OS/2.

Priced at \$795, SA Reverse Data Engineer was designed to work with databases from Informix Corp. and Oracle Corp. and Microsoft's SQL Server and IBM's DB2.

We're Minding Ours.



At Lexmark, we take a close look at every aspect of character generation to make sure your IBM equipment delivers maximum performance.

IBM printers and toners are designed to work with the machines they fit. The result is perfect compatibility.

Like the "C" generated on an IBM LaserWriter. Even at the extreme point size, the "C" is pretty perfect.

Our product engineers spend their time counting letters like the "C" searching for improvements in character generation.

If you own an IBM® printer or typewriter, you don't have to buy replacement ribbons and toners from the manufacturer. But you should.

Lexmark is dedicated to making sure the output of our IBM supplies is as high-quality as the IBM machines they grace. So, if it's replacement time for your IBM ribbon or toner, we suggest you give Lexmark a call, PDQ.

To order, to locate the dealer nearest you, or to receive your free catalog, call 1-800-438-2468, ext. 80. (In Canada, call 1-800-663-7662.)

Lexmark International, a former subsidiary of IBM, is an independent, worldwide company that develops, manufactures, and markets IBM personal printers, IBM typewriters, related supplies and keyboards.



IBM Supplies by

LEXMARK.

Make Your Mark

IBM is a registered trademark of International Business Machines Corporation in the United States and in other countries and is used under license. Lexmark is a trademark of Lexmark International, Inc. © 1992 Lexmark International, Inc.

Application development tools

Guidance Technologies, Inc. has introduced Choreographer 3.0, a new version of the company's corporate application development software.

Choreographer is a tool designed to develop cooperative computing, client/server applications and text to graphical user interface conversations, the company reported.

Support is provided for the full 32-bit architecture of IBM's OS/2 2.0 and for Microsoft Corp.'s Windows. IBM's Common User Access (CUA) widget control set consisting of notebook, sliders, container, drag and drop and spin button is also included, according to the company.

Choreographer costs \$7,500.

► **Guidance Technologies**

600 Pinalist St.
Pittsburgh, Pa. 15212
(412) 231-1200

KnowledgeWare, Inc. has announced Release 2.7 of its Application Development Workbench (ADW).

The product is an integrated application development solution designed for client/server, midrange and mainframe environments, the company reported.

Integration enhancements have been added to ADW 2.7, along with more design facilities and more rapid application development capabilities. Enhanced code-generation products and industry-leading database analysis and design tools are also included.

ADW 2.7 prices range from \$4,050 to \$10,750.

► **KnowledgeWare**
3340 Peachtree Road NE
Atlanta, Ga. 30326
(404) 251-8678

Computerworld Readers Deserve Only the Best

MAGAZINEWEEK.
The Newsweekly of Magazine Publishing

Bill Laberis
Editor in Chief, Computerworld
375 Cochituate Road
Framingham, MA 01701

Dear Bill,

I'd like to extend congratulations to Computerworld, the Newspaper of IS, as a recipient of MagazineWeek's Editorial Excellence Award. Your editors' steadfast dedication to bringing the news every week for 25 years to the information systems professional has earned Computerworld this well deserved recognition.

Our Editorial Excellence Awards are presented to those publications that demonstrate commitment to their editorial mission, along with achieving overall quality. Thus, a publication nominated for an Editorial Excellence Award is competing against itself, not against other publications in its field.

What also makes the MagazineWeek Editorial Excellence Awards unique is that selection is based upon judging multiple issues, not just a single copy in order to determine consistency in producing an outstanding editorial product. The fulfillment of the publication's editorial mission, a mix of superior articles, well-defined departments and integrated, high-quality design and production — this is what earns a MagazineWeek Editorial Excellence Award.

Sincerely,



Donald L. Nicholas
Editor in Chief, MagazineWeek

COMPUTERWORLD
In Issues of 5
Weeks

Third Annual MAGAZINEWEEK EDITORIAL EXCELLENCE AWARD

Presented to

Computerworld

For establishing the highest standards in the definition, recognition and achievement of its editorial mission.

June 10, 1992



Robert M. Elmer
Managing Editor, MagazineWeek



Donald L. Nicholas
Editor in Chief, MagazineWeek



Because of our long-term recruitment success, we continue to place 100% of our national media advertising in one publication. Computerworld.

Stephen J. Kukoy
President
National Computer Associates

Stephen J. Kukoy is not only President of National Computer Associates, but also President of Abacus Consultants, Inc. in Denver. Having been in the recruitment business for nearly 15 years, he knows the critical role advertising plays in finding the best qualified professionals. He also knows where his recruitment advertising dollars are best spent.

"Founded in 1971, National Computer Associates (NCA) is an exclusive group of private firms dedicated to importing and exporting computer personnel on a national basis. With an active membership of 30 firms throughout the United States, Great Britain, Canada, and Australia, NCA is virtually a network of "branch offices" working together to place the best qualified IS professionals in the right jobs. Today, NCA's aggressive growth and strategic market positioning make recruitment advertising more important than ever.

"Since Computerworld is the most respected professional newspaper for computer professionals, we believe it's our most direct means for reaching our entire target audience - programmers, systems, analysts, and IS directors ... operations, technical support, telecommunications, and PC professionals ... even vice presidents and presidents. And with its national reach, Computerworld is the perfect place to tell these IS professionals about how NCA, with its pooled resources and industry expertise, offers them a wider variety of jobs in more companies in just about every location.

"Because of our long-term recruitment success, we continue to place 100% of our national media advertising in one publication. Computerworld. Time after time, Computerworld produces top-calibre candidates - qualified professionals who are truly interested in keeping their careers abreast of the industry's rapid changes and trends.

"Looking ahead, we expect several factors to escalate our recruitment advertising needs - the growing demand by clients for greater selectivity, an increasingly specialized industry, a continually mobile marketplace, and NCA's expansion into the lucrative European marketplace. As this all happens, we intend to increase our advertising budget in Computerworld proportionately.

"Computerworld recruitment advertising has been equally successful for Abacus Consultants. Although we've experienced many such situations, one specific instance comes to mind. After local advertising proved unsuccessful for finding a particularly hard-to-find individual in the Denver area, the client gave us the go-ahead to advertise nationally. We ran one recruitment advertisement in Computerworld - and got an instant response from just the candidate we were looking for - right here in our local area. It just goes to show that Computerworld delivers far better candidates than any other source.

Computerworld. We're helping serious employers and qualified information systems, communications, and PC professionals get together in the computer community. Every week. Just ask Stephen J. Kukoy. For all the facts on how Computerworld can put you in touch with qualified computer professionals, call John Corrigan, Vice-President/Classified Advertising, at 800/343-6474 in MA, 508/879-0700.

COMPUTERWORLD

Where the qualified candidates look. Every week.

COMPUTERWORLD

COMPUTER CAREERS

The hotel welcome mat is out

Employers nationwide search for the strongest applicants to fill their ranks.

T

W

IF YOU WANT TO TITLISE

Program Manager

Program Manager

Program Manager

Program Manager

Program Manager

Program Manager

Program Manager

Program Manager

Program Manager

Program Manager

Program Manager

Program Manager

Program Manager

Program Manager

Program Manager

Program Manager

COMPUTER CAREERS EDIT

1 800 343-6474
IN MA 508 879-0700

BEST READ

CEMI

CEMI

CEMI

CEMI

CEMI

CEMI

CEMI

CEMI

CEMI

CEMI

Computer Careers

Job Outlook '93

Managers cautiously optimistic about hiring

By Kelly E. Sewall

IF YOU'RE A MEMBER of an information systems staff that's been overlooked for the last year because your department has been downsized, help may be on the way. While there isn't a lot of new hiring taking place, the few companies that have lifted their hiring freetees are making room for programmers and systems analysts, according to interviews with 15 IS managers on their hiring plans for 1993.

But the greatest promise seems to be in contract programming. Companies aren't taking any risks these days by creating positions they might have to cut if things don't turn around. Instead, they're easing into the hiring areas with contractors.

Training resurgence

In addition, a shift toward fulfilling support and training needs from the inside seems to be under way. As more and more responsibility is shifted to the end user, help desks are being inundated with calls.

"Help desk people get called for anything that's plugged in: PCs, mainframes and even the telephone system. We also take them to install the machines and do hardware and

software support," says David E. Pinkus, manager of MIS at Fuller Co. in Bethlehem, Pa. Pinkus says the high volume of calls the help desk has been receiving since the firm began downsizing has created a need for more help desk operators.

IS managers such as Pinkus will also be hiring in-house trainers to keep up with the training needs that were put on hold in recent years.

"We lost [our former position] due to a general outlook, and we intended to bring it back," he says. "We'll be moving a lot of people from CRTs to PCs, and it's more economical to have that position in-house than to keep hiring from outside."

The need seems to be growing as more PCs find their way onto users' desks. PC software and support skills will be in hot demand in 1993. And since these PCs will be networked, it follows that local- and wide-area networking specialists will also be in demand.

All managers interviewed empha-

sized that because IS professionals now work with the user community more than ever before, business knowledge is becoming a mandatory requirement in most shops.

"In our industry [wholesale auto parts], you could buy a turnkey system and virtually run with no data processing staff," says Jay Dahl, data processing manager at Hatch Grinding Co. in Denver. "Or you find someone like me. If a person like [me] is going to remain in existence,

we've got to do a better job than the turnkey packages, and the turnkey packages are pretty damn good."

Dahl must be and his department maintain their value to the company by paying close attention to the auto parts business.

"Understanding the mission statement of the company is really important, as well as knowing how the data processing department fits into that," he says. "You need to produce something quantifiable to the bottom line, not just accumulate

more junk in a computer room. You need to be able to talk to the user and solve problems without all the smoke and mirrors."

For shops that won't have jobs under their Christmas trees, the most oft cited reason was a continuation of downsizing and outsourcing.

Layoffs on some agendas

"We're in the process of laying people off now. I'm not sure how many more that will involve," says Steve Hicks, data center director at Clark Information Technology, a subsidiary of Clark Equipment Co. in South Bend, Ind. "We've laid off 15 or so over the last year and a half [out of 35 to 40], and I may be included in that, too. If things keep going the way they are." He says his firm is trying to land some outsourcing contracts to preserve its livelihood.

Several IS managers say they can't make any hiring decisions until the second half of the year, when Bill Clinton's impact on the economy will become clearer. But most insist that once they pass this mark, they plan to reevaluate their staffing needs. Hopefully, that will mean more IS jobs in the latter part of '93.

Sewall is an assistant editor, Features.

1993 IS job market

- Top jobs
- Contract programmer
- Programmer analyst
- Senior systems analyst
- Assistant database administrator
- Help desk technician
- Trainer
- Project leader
- LAN administrator
- Computer operator
- Top technical skills
- PC software
- PC support
- LAN/WAN
- SQL
- CASE
- Telecommunications
- Top business skills
- Business acumen
- Ability/flexibility to adapt to change
- Decision-making ability

Source: 15 IS managers interviewed by Computerworld

Firms that are hiring are making room for new programmers and systems analysts.

INFORMATION HAS ITS REWARDS

When it comes to the overall picture of professional employment, salary data is important.

But as a manager, you also need to consider the pressing issues of benefits, training, turnover and managing costs through strategic staffing.

You'll appreciate the 1993 **SALARY GUIDE** from the **Robert Half®** and **Accountemps®** organization that offers a comprehensive view of the nationwide current salary levels in Information Systems, Accounting, Finance and Banking key positions.

The Guide also includes useful information on benefits programs, trends in hiring and employee retention.

To obtain this **FREE Salary Guide**, call your local **Robert Half** office or call toll free today:

In USA: 1-800-458-5700 Ext. 161



ROBERT HALF
Specialized Recruitment For The
Information Systems Profession

©1992 Robert Half International Inc. An Equal Opportunity Employer.

1993
SALARY
GUIDE

ROBERT HALF
ACCOUNTEMPS

Career advice for the '90s

Handling a new discrimination



Fast Track is a twice-monthly column devoted to answering questions on career

directions. This week's guest adviser is R. Maz Stuzer, a marketing director at Contract Solutions, Inc. in Salem, N.H.

Q: In our information systems department, if you don't participate in company-sponsored events such as United Way drives, you're not promoted, the employees are told. How can I handle this?

A: It is illegal to discriminate against a person based on his participation or lack thereof in company-sponsored events. However, if these charities are worthy, a voluntary contribution may resolve your concerns.

If you choose to resist, you must keep thorough documentation. Keep notes on how you're approached, how you've been discriminated against, and how you've been affected. Write letters to your superiors outlining specific actions taken against you.

If you decide to take action against this alleged discrimination, be prepared for a long, hard fight.

Q: I am a technical services support specialist, which is similar to a

systems analyst/programmer. It is a civil service job at a municipality. I am the only person in this position and have benefited from being exposed to a wide variety of computer technologies. But I feel I may be becoming out of touch comparatively.

Should I move into the private sector before I become too state?

A: It wouldn't hurt to look. You express a desire to stay competitive to ensure that your skills remain viable and marketable.

Never assume that a recession, or any other uncontrollable event, means there are no opportunities for you. While environmental factors should influence your decision to accept an offer, they should not deter you from exploring options.

Q: I'm a Unix systems administrator who has six years' experience at an insurance firm and a strong PC background. I've had little success in getting any employer to provide more Unix training, such as systems administration and programming.

How can I get into another firm that will offer me this training?
A: Back up and gather focus. First, assess your technical skills and your level of expertise. Then think of what you'd like to be doing five years down the road. This focus should help you target new opportunities or even get

movement from your current employer.

Q: I recently lost a job offer because two agencies submitted my resume to a hiring manager, and both claimed to have authorization to represent me. Rather than be caught in the middle, the manager decided to hire

someone else. How can I prevent this in the future?

A: Let no agency submit your resume to any prospective employer without getting your permission. Keep a journal on where you have allowed your resume to go. If another agency calls with the same job, clearly tell them not to send your resume. If they do, refuse to do any more business with them and tell them to make your file inactive.

If you control where your resume goes, you won't lose future jobs to double submittals.

■ Sure that you're being undervalued? Stressed out? Worried about skills stagnation? WE WANT TO HEAR ABOUT THESE AND OTHER ISSUES THAT AFFECT YOUR CAREER. CALL YOUR QUESTIONS IN USING THE FAST TRACK LINE AT (508) 820-8522 OR SEND THEM BY FAX TO KELLY E. SEWELL AT (508) 875-8931. IF WE USE YOUR QUESTION, WE'LL SEND YOU A GIFT.

How to explain your layoff in future interviews

Being laid off is no reflection on your technical skills or ability as a worker. It's more a reflection of a company's poor management. The fact that you've been laid off wouldn't affect any decisions to hire you. So how you handle the layoff. When you come into an interview, you have to put the layoff aside and look to the future, showing optimism and confidence in your abilities.

*Denise E. Love, information systems director
Acme Thread-and-Supply, Inc., Los Angeles*

■ Don't let the someone who's been fired, who did something wrong, who's not competent, or who doesn't have the proper skill set. It's an unfortunate situation that put you out there, but there's nothing wrong with your skill set or your ability to perform the job. Be positive.

*Jerry Lesser, vice president of information services
Handyman Co., Troy, Mich.*

■ If you're not employed, you need to state it. But I'd wait for the interviewer to raise the question of how your job ended. Once it's raised, be brief and to the point.

*Michael Jacko
VP and director, IS
The House Co., Columbia, Md.*

■ The only way you can mislead a layoff in an interview is to be defensive, bitter or negative about it. If, or if you attempt to evade or hide it. Instead, you should be up front and positive about it.

*Steve McMahon, managing director
Source EOP, Boston*

Compiled by Kelly Sewell, assistant editor, FastTrack.

SYSTEMS ANALYST

Distribution Center.

We are the world's leading manufacturer of women's intimate apparel products. Our organization in the Far East has an opening for a Systems Analyst.

Requirements

- Bachelor's degree (or comparable) in Computer Science and/or Business Administrations with 3 (+) years of working experience.
- In depth understanding of Distribution and Manufacturing concepts (Allocation, Replenishment, Shop Floor Control, Production Scheduling, MRP)
- Working knowledge of project management and all phases of software development life cycle
- Experience with CASE tools, PC and Bar Code equipment is essential.
- Working knowledge of an AS/400 and/or UNIX environment with the languages C, RPG400 and/or COBOL are desirable

The successful candidate will provide primary interface for all user problems, answer technical questions and requests within the applications development group, work with user areas to establish priorities, and provide recommendations and directions for process improvement through automation; skills in an Asian language is a plus.

We offer an attractive compensation package, relocation assistance and the technical and analytical challenges you would expect in a state-of-the-art environment. The position will report to Senior Management.

Please forward your resume, along with salary requirements to:

Claus Flury
3964 Fieldcrest Drive
Corland, NY 13045

1993
COMPUTER
INDUSTRY
SALARY
SURVEY

FREE!
1993
COMPUTER
INDUSTRY
SALARY
DATA

Wital Planning Guide for Candidates & Employers

As 1993 unfolds, up-to-the-minute data on compensation trends within the U.S. Information Systems industry will be critical to the career planning and staffing strategies of every U.S. candidate and employer.

To give I/S professionals that vital strategic edge, the member firms of National Computer Associates now offer you our 93 Salary Survey pamphlet, which projects salaries for 26 industry job titles (including 6 key new titles) in all major U.S. regions.

These 1993 salary/bonus guidelines are yours FREE, as a service to the profession, from the members of our network of independent I/S recruitment and placement specialists. Call our nearest office.

Contact us today for your copy, & for details on 1993 career openings & qualified candidates

ATLANTA: America's Computer Inc.
BOSTON: Robert Brown & Co. Inc.
CHICAGO: Robert Brown & Co. Inc.
CINCINNATI: Frank Brown
CLEVELAND: Robert Brown & Co. Inc.
COLUMBIA: Robert Brown & Co. Inc.
DALLAS: Robert Brown & Co. Inc.
DENVER: Robert Brown & Co. Inc.
DETROIT: Robert Brown & Co. Inc.
HOUSTON: Robert Brown & Co. Inc.
LOS ANGELES: Robert Brown & Co. Inc.
MINNEAPOLIS: Robert Brown & Co. Inc.
NEW YORK: Robert Brown & Co. Inc.
PHILADELPHIA: Robert Brown & Co. Inc.
PORTLAND: Robert Brown & Co. Inc.
SAN FRANCISCO: Robert Brown & Co. Inc.
SEATTLE: Robert Brown & Co. Inc.
SPRINGFIELD: Robert Brown & Co. Inc.
TAMPA: Robert Brown & Co. Inc.
WASHINGTON: Robert Brown & Co. Inc.
WICHITA: Robert Brown & Co. Inc.

HOUSTON: Computer Concepts, Inc.
JERSEY CITY: NJ Systems Search M.E.
KANSAS CITY: Robert Brown & Co. Inc.
LAS VEGAS: Robert Brown & Co. Inc.
LOS ANGELES: Robert Brown & Co. Inc.
MEMPHIS: Robert Brown & Co. Inc.
MINNEAPOLIS: Robert Brown & Co. Inc.
NEW YORK: Robert Brown & Co. Inc.
PHILADELPHIA: Robert Brown & Co. Inc.
PORTLAND: Robert Brown & Co. Inc.
SAN FRANCISCO: Robert Brown & Co. Inc.
SEATTLE: Robert Brown & Co. Inc.
SPRINGFIELD: Robert Brown & Co. Inc.
TAMPA: Robert Brown & Co. Inc.
WASHINGTON: Robert Brown & Co. Inc.
WICHITA: Robert Brown & Co. Inc.

ROCHESTER: Robert Brown & Co. Inc.
SAN DIEGO: Robert Brown & Co. Inc.
SAN FRANCISCO: Robert Brown & Co. Inc.
SEATTLE: Robert Brown & Co. Inc.
SPRINGFIELD: Robert Brown & Co. Inc.
TAMPA: Robert Brown & Co. Inc.
WASHINGTON: Robert Brown & Co. Inc.
WICHITA: Robert Brown & Co. Inc.

National
Computer
Associates

PROGRAMMER/ ANALYSTS

AGS, a NYNEX* Company, is a recognized leader in the design and implementation of applications and systems software. We employ over 2,500 computer professionals in 50 offices in the U.S., Canada and England.

We have career opportunities for data processing professionals with a minimum of 2 years experience developing applications or systems software with any of the following skills:

- Microfocus COBOL, DB2
- DB2, IMS, CICS
- C, UNIX*, ORACLE, SYBASE
- C++, MS-Windows
- C, VAX/VMS, RMS/Rdb

AGS offers outstanding career advancement opportunities, competitive salaries and an excellent benefits package including medical and dental coverage, relocation assistance, training, tuition reimbursement, a 401K savings plan and more. Please contact:

AGS

A NYNEX* Company

Technical Resources Manager
AGS Information Services, Inc.
One Tower Lane
Suite 2620
Oakbrook Terrace, IL 60181
Tel.: 708-574-7440
FAX: 708-574-7567

An Equal Opportunity Employer M/F/H/V UN*X* is a tm of AT&T

Financial Software Engineer (C/C++), 40 hrs/week, 8:00-5:00, full-time. The Financial Software Engineer will be responsible for the design, development, testing, and implementation of system software for financial applications. The Financial Software Engineer will be responsible for the design, development, testing, and implementation of system software for financial applications. The Financial Software Engineer will be responsible for the design, development, testing, and implementation of system software for financial applications.

PROGRAMMER ANALYST - we seek a Programmer Analyst with 2-5 years of experience in the design, development, testing, and implementation of system software for financial applications. The Programmer Analyst will be responsible for the design, development, testing, and implementation of system software for financial applications. The Programmer Analyst will be responsible for the design, development, testing, and implementation of system software for financial applications.

RELOCATION SPECIALIST

IBM P/A,
S/P/A, DBA's

Specialize in relocating CP programmers to projects throughout the United States. Free info by mail. 18 years IBM & IBM Corp. experience.

John M. Cook
Cook & Associates, Inc.
P.O. Box 1778
Dunbar, MA 02821
817-475-4071
Fax: 817-475-4339

Over
629,000
computer
professionals
read
Computerworld
weekly.

The Missing Piece(s)?

A career isn't easy to put together. Often it's a matter of finding the missing piece(s) that make the puzzle fit.

At SORDYL & ASSOCIATES you will work for a leader in the field of unique applications development. Our employees enjoy the professional recognition and variety of assignments only a consulting firm can offer, excellent compensation and benefits, and advancement based on performance.

Specific needs in the following areas:

MANTIS CICS SUPRA IDMS FOCUS UNIK

If you have at least 2 years product experience and the drive to be the best, you owe it to yourself to contact us. Requirements to the East and Mid-west. Call collect or drop in as time - we have a lot to talk about.

Sordyl & Associates Inc.

Robert B. Finkel, Director, Regional Operations
105 Main Blvd., Suite 362-E, Monroeville, PA 15146
Call Collect (412) 656-1780

SOFTWARE ENGINEERS wanted. Seeking to join a firm that provides software for the state of the art. The firm is currently seeking software engineers for the state of the art. The firm is currently seeking software engineers for the state of the art. The firm is currently seeking software engineers for the state of the art.

COMPUTER INTELLIGENCE.



The best way to get ahead is to join Computer Intelligence. We're one of the largest and most respected IBM, 100 software service companies in the Research Triangle area of North Carolina—and have been for over 20 years. With a client list as impressive as our professional staff, we provide a diverse range of consulting and permanent assignments. Join us if you have 2+ years of experience and learn the intelligence difference.

TO GET AHEAD, YOU NEED INTELLIGENCE.

With high quality assignments, we're able to offer some of the highest compensation in the area. IBM or SAS year resume to Computer Intelligence, Inc., Dept. CW104, P.O. Box 90799, Raleigh, NC 27634-9999. Fax: (919) 676-6444. Phone: (919) 676-8000 or (800) 833-5443 nationwide. EOE



PROGRAMMER ANALYSTS

Established consulting firm specializing in contract programming and systems development has immediate national opportunities for programmer analysts with any of the following software experience:

- CASE
- OPEN SYSTEMS
- IDEAL
- STRUCTURED METHODOLOGY
- FOCUS
- UNIK
- CICS
- APS
- SQL BASED DBMS

Also needed are consultants that have developed systems in a client service environment.

Please phone, write or fax resume to:

Pittsburgh Business Consultants, Inc.

Major global team presents software for Chicago. System developed for the state of the art. The system is currently seeking software engineers for the state of the art. The system is currently seeking software engineers for the state of the art.

Senior Programmer must be able to design, develop, test, and implement system software. The Senior Programmer must be able to design, develop, test, and implement system software. The Senior Programmer must be able to design, develop, test, and implement system software.

Senior Programmer must be able to design, develop, test, and implement system software. The Senior Programmer must be able to design, develop, test, and implement system software. The Senior Programmer must be able to design, develop, test, and implement system software.

Computer Careers Midwest

S

oftware Developers

Success is a reflection of our people.

Walker Richer & Quinn, Inc. creates Reflection software products linking microcomputers with host computers in HP, DEC, UNIX and IBM environments. Our development platforms include DOS, Microsoft Windows and Macintosh. Our sales have increased nearly 400% in the last five years. And 32% of all sales are outside the United States, making us a recognized world leader in nearly 50 countries. Our software is used by over half the Fortune 500 companies and we've won several awards for outstanding products. Our success and continued growth have generated openings.

See yourself showcasing your creative programming skills in WINDOWS development. In-depth knowledge of Windows, including DLLs, Display and/or Virtual Device Drivers and extensive programming experience in C and C++ is required. Experience with AS/400, VAX and UNIX is a plus.

Additional positions require AS/400 Communications, X-windows and OS/2 experience. If you love to program, and have six to eight years experience, contact us today.

All this, and a great place to work, too!

Walker Richer & Quinn has developed a unique corporate culture based on the nature of the industry, the influence of the Pacific Northwest and the character of its founders. Flexibility, creative freedom and individual responsibility are the keys to making every employee a valued team member. CEO Magazine recently listed WRQ as one of the top 25 companies to work for in Washington state.

To join our team,
fax or mail your resume in confidence to:
A. Humble
Dept. CW14

Walker Richer & Quinn, Inc.

2815 Eastlake Avenue East
Seattle, Washington 98102-1876
Fax: 206/860-5835

An Equal Opportunity/Affirmative Action Employer

REFLECTION
SOFTWARE

A RARE FIND

Software Engineers

Applied Signal Technology, Inc. is leading the way with the latest in digital signal technology. We have immediate openings for enthusiastic Software Engineers to participate in all phases of development, including design, implementation, integration and testing.

The professionals we seek must have one of the following: proven experience in embedded control applications in which DSP hardware is controlled and managed from embedded control software running under UNIX for similar operating systems; or X-Windows/Motif user interface applications which provide sophisticated and powerful control and monitoring interfaces between users and our equipment. Qualifications include a BS/MS (CS/EE) or equivalent and 3+ years' industry experience.

For immediate consideration, please send your resume to: Applied Signal Technology, Inc., CW 100, 160 Solomonte Way, Sunnyvale, CA 94086. We are an equal opportunity employer. U.S. citizenship required. Government security clearance desired.

..... Applied
Signal
Technology, Inc.

UNIX is a registered trademark of UNIX System Laboratories, Inc.

Results.

Computerworld gives recruitment advertisements results. Weekly. Regionally. And Nationally.

To place your ad, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700).



Weekly, Regional, National. And it works.

An IDG Communications Publication

ANOTHER REASON WHY COMPUTERWORLD RECRUITMENT ADVERTISING WORKS ...

Computerworld gives its readers career updates on today's computer skills and employment issues.

And it does this through special Computer Careers editorial that anchors *Computerworld's* recruitment advertising section every week. Whether it's informing IBM professionals on their career paths, or updating UNIX experts on what's ahead with their careers, *Computerworld* delivers the most pertinent and frequent computer career information available in America.

To place your ad regionally or nationally, call John Corrigan, Vice President/Classified Advertising, at 800/343-6474 (in MA, 508/879-0700).

COMPUTERWORLD

Where the qualified candidates look. Every week.

COMPUTERWORLD

Where the qualified candidates look. Every week.

Computerworld recruitment advertising works!

That's because more computer professionals read more recruitment ads in *Computerworld* than in any other newspaper.

For more information or to place your ad, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700).

Weekly, Regional, National.
And it works.

An IDG Communications Publication

Computer Careers Midwest



A major Fortune 500 company seeks to establish a new MIS Department in Southern California. Only MIS professionals with a degree in Computer Science, Business Administration or related field, appropriate experience, and a thorough understanding of the systems, languages and programs listed need apply.

Project Leaders

6 positions • Job Code "PL"
5 years' recent experience in one of the following areas:

- Financial package implementation (knowledge of NSA is a plus)
- Implementation of Oracle Financials and/or Oracle based Financial Applications
- Manage the development of medium to large Oracle RDBMS applications in a distributed, network environment. A broad base of Oracle Tool Set and Database design/modeling is required. Case experience is a plus.
- R&D in executive IT solutions

Database

Administrators

5 positions • Job Code "DBA"
At least 3 years' recent experience in one or more of the following areas:

- DBA for Oracle RDBMS (Sybase experience is a plus)
- Data Modeling/Procedure Development/SQL
- Case Tool experience is a plus
- SQL, C, C++, COBOL, Paradox Pal, Easel

An Equal Opportunity/Affirmative Action Employer

Systems Analysts/ Programmer Analysts

12 positions • Job Code "SA"
At least 2-3 years' recent experience in one or more of the following areas:

- Database Modeling/Design
- Design/Development/Management of small to medium size applications
- Oracle RDBMS, Oracle SQL*Forms 3.0 w/ PL/SQL, SQL*Plus, SQL*Report Writer, SQL*Test retrieval, Oracle Card, Oracle Data Query
- SQL, C, C++, COBOL, Paradox Pal, Easel
- DYNIX/PTX, VAX/VMS, DOS, Windows
- Oracle Case Tools or other case tools experience is a plus
- Paradox DB design/implementation
- R&D in executive IT solutions

These positions offer competitive salaries, good benefits and a challenging work environment. If you're interested in becoming part of an important MIS team, send your resume, salary requirements and indicate job code, by January 18, 1993, to:

Box # CW8231
Job Code
COMPUTERWORLD
P.O. Box 9171
Framingham, MA 01701

Supervisor, Architectures and Development Technologies

We are a major South Florida corporation with a position available for an individual to work in our Information Management-IT Technology Planning department.

Candidate will create, document and communicate a comprehensive company-wide architecture for computer, network, software and application development. Responsibilities will also include documenting and maintaining organization-wide technical standards for computer and network facilities, software and software development and policy in connection with technical standards.

This individual must possess a minimum of 10 years' experience in some phase of information technology with emphasis on creating, documenting and communicating an organization-wide computer network, software and application development architecture in a distributed processing technical environment. The most recent two years of experience should be in an advanced technology group, an architecture planning group or an advanced technology implementation group. Business system development experience in a distributed processing environment is highly desired. A minimum of Bachelor's degree in Computer Science or equivalent experience and thorough knowledge of computer, network, software and application development technologies, computer and network planning techniques and architectural models is also required.

We offer a challenging work environment, competitive salary and excellent benefits package. Qualified candidates should submit resume to:

Department CW/1493/S
801 Brickell Avenue, Suite 300
Miami, FL 33131

Equal Opportunity Employer M/F/D/V

IS Directors

If you need good people, we've got them. Computerworld reaches more than 629,000 computer professionals every week. That's more qualified computer pros than any newspaper can deliver. And you can select editor or regional editor or national editor of Computerworld's Computer Careers section for your advertisement.

For more recruitment information, or to place your ad regionally or nationally, call Lisa McGrath at 800-343-6474 or in MA, 508-679-0700.

Computerworld

Weekly
Regional
National

And it works.

MANAGEMENT CONSULTING

MSB-Basic Concepts/Networking

Are you interested in joining a rapidly growing, nationally recognized management consulting firm? The Warner Group is seeking a wide range of engineering, planning, design and implementation specialists to government and industry. As a result of exceptional growth, we are seeking specialists in the following areas:

- Networking & Data Communications
- Data Processing System Design & Implementation
- Basic business process & Systems design and a best 4 phase consulting or project management experience.
- LAN/WAN/Intranet design, implementation, maintenance, LAN/WAN/Intranet design position requires design, RFP and implementation experience. Some knowledge of CASE tools and UNIX preferred.

We offer a personal commitment with a highly competitive salary and benefit package. If you would like to consider an opportunity with The Warner Group, please forward your resume and salary history to:

The Warner Group
4444 BROADWAY, SUITE 300
WOODLAND HILLS, CA 91367
In San Francisco: 415-341-1111

Manager, Information Systems

Electric utility on Oregon coast seeks Manager of Information Systems.

Directs overall IS activities, including systems analysis, application development, programming, hardware use & deployment, and operational department personnel. Qualifications include: BBA or BS degree or extensive related experience; five years extensive experience working with IBM AS/400 System 38, PC networks, and DB systems; five years experience in supervising IS staff.

Salary range \$5-\$44K, commensurate with experience. Send resume to: Personnel Services, Central Lincoln P.U.D., P.O. Box 1128, Newport, OR 97365. Applications accepted through Jan. 15, 1993.

An Equal Opportunity Employer.

This
Space
for
HIRE!
CALL:

800-343-6474

in MA,
508-679-0700,
ask for
John Corrigan,
Vice President
Classified
Advertising.

COMPUTERWORLD

Weekly
Regional
National
And it Works!

Computer Careers

Midwest

JUST DO IT.

NIKE, the world leader in athletic footwear and apparel, is actively seeking talented professionals to join our 400 person I.S. Department. Current opportunities include:

Capacity Planner

BSCS plus ten years' directly related experience, or a minimum of twelve years' experience without a degree is required. Broad knowledge of computer system hardware and software architecture; knowledge of MVS, C6100, AS/400 and UNIX; knowledge and skill using statistical analysis, modeling and forecasting methods; and the ability to communicate technical data to a diverse audience are also important.

Storage Administrator

Requires at least five years' work experience as a senior operator, programmer or production support analyst; knowledge of MVS, C6100, AS/400, UNIX and storage management utilities.

PC Programmer Analyst

Requires a Bachelor's degree and a minimum of 2 years' programming experience, or two additional years' experience without a degree. Experience must include PC programming, PC hardware and software installation, telephone support, and PC telecommunications. Strong interpersonal skills required, both oral and written. Some travel required.

Sr. Programmer Analysts & Programmer Analysts

Requires a Bachelor's degree and a minimum of 2 years' experience for PA positions, and a Bachelor's degree and a minimum of 5 years' experience for Senior PA positions. Two or more years of solid application development experience in multiple platform environment may be substituted for a degree.

Technology Development Specialist

Requires a Bachelor's degree in Computer Science or a similar discipline, plus 3 to 4 years' experience in evaluating PC and Macintosh software, or 5 to 6 years' equivalent experience without a degree. In addition to our new 77 acre campus, you will enjoy a competitive salary and outstanding benefits.

Please forward your resume to: NIKE, Inc., Employment Center CW-3, Nolan Ryan Bldg., One Bowman Drive, Beaverton, OR 97005. Equal opportunity employer. *Trademarks are registered to their respective companies.



HIGHLY SKILLED PROFESSIONALS HIGHLY DESIRED

The world of high finance is a tremendous technical challenge especially in supporting such incredible growth. Fortunately, we can offer some very special incentives for results-oriented Data Processing professionals: line access to the latest technology; all the best resources; and some of the most talented people in the business. Here is your chance to make an impact on a growing IS department.

Information Systems Opportunities

Put your solid technical aptitude to the test as a Support Analyst for the Bachman CASE product set, providing support to our data modelers. Specific responsibilities include: consulting, training, troubleshooting, coordinating and installing new product releases. To qualify, you should have at least 2 years of data modeling experience using a CASE product. Experience with the OS/2 Bachman Analyst and DBA is preferred. Good communication skills are a must. Working knowledge of OS/2, Database Manager and Query Manager is highly desirable.

We anticipate future openings for individuals to handle internal support of our HPS CASE Tool. Experience with HPS is desired. Candidates with IEF or IEW would be considered. A background with OS/2 and Novell Network is a plus.

We offer the competitive salaries, excellent incentives and comprehensive benefits of a recognized industry leader. For immediate consideration, please send your resume with salary history to: Charles Schwab & Co., Inc., Human Resources, Dept. CR-61, 181 Montgomery Street, San Francisco, CA 94104. FAX (415) 627-7316. EOE.

Charles Schwab

Helping investors help themselves™

See jobs on-line today!

Just dial 508
879-4700 with
your computer
and modem and
you can access
the most up-to-
date computer
job listings in
Computerworld!

Where do the best computer professionals look for jobs?

Right here. In fact, more computer pros read more computer recruitment ads in *Computerworld* than in any other newspaper.

Talk to the best. Run your ad in *Computerworld*. For more information or to place your ad regionally or nationally, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700).



Weekly, Regional, National.
And it works.

Computerworld recruitment advertising works!

That's because more computer professionals read more recruitment ads in *Computerworld* than in any other newspaper.

For more information or to place your ad, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700).

Weekly, Regional, National.
And it works.

An IDG Communications Publication

COMPUTERWORLD



Computer Careers

- ✓ Pacific Northwest and California Opportunities
- ✓ Outstanding Projects
- ✓ Outstanding Consulting Company

- OC/VSAM/COBOL
- VSAM/COBOL/Basic
- DB/ICSP or DB/NEW
- Real Basing
(Loans, ATMs, ACH,
 Investments, Trust, etc.)
- Smalltalk V
- UNIX Paks C++, Sybase
- MVT tuning analyst (MTC)
- C++ - Object Oriented
 Analysts

5 years O.P. experience
required for all positions
Reply to:

DATRONICS, Inc.
181 Kalmus Dr., Ste. C-200
Corte Madera, CA 94929
Phone (415) 921-2000
Fax (415) 921-3800

DR. WILLIAM ALFRED
SOUTHWELL DIVISION

\$30,000-\$65,000
Salaried & consulting
positions nationally

RSVP SERVICES
P.O. Box 6389
Cherry Hill, NJ 08002-0389
(609) 277-0153
FAX: (609) 687-2988
Planning professionals since 1988

SOFTWARE ENGINEER - 40 hrs/wk. Ann. \$42,000.00 per yr. Design, develop and implement software systems and maintain existing systems utilizing UNIX and DOS. Carry out test plans, maintain and support. Requires Master's Degree in Computer Science. 1 year experience in job offered or 1 year experience as Systems Programmer or Systems Engineer. Must have work in IBM, JCL, batch and memory storage systems and in networking. Education must include 3 semesters of graduate course work with course in computer graphics and statistics. Send resume to: 7315 Woodland Ave., Rm. 415, Detroit, MI 48202. Ref No. 82862.

INFORMATION SYSTEMS MANAGER

Champaign. Since \$55,000, the City of Champaign is currently looking to fill the position of Information Systems Manager. The director-level position within the Finance Department, reporting to the Finance Director, The successful individual will be responsible for the supervision of a staff of 4 in the overall management of the City's computer system which include a minicomputer and local network. Responsibilities include establishing and monitor adherence to system procedures and standards, for system maintenance, and system development of all City Department and recommending, selecting, installing systems and equipment, training and users as appropriate. Contact with the

graduate degree in computer science or related field or any combination of experience and training. This position offers an annual starting salary \$43,000 - \$48,500, along with excellent benefit package. Interested applicants should submit resume by 5:00 p.m., February 1, 1989, to City of Chicago, Personnel Services Department, Attn: Gary Winkley, 122 N. Dearborn, Chicago, IL 60610.

PROGRAMMER ANALYST
Responsible for the design, programming & implementation of corporate data processing systems including the maintenance of a fixed program base.

Requirements: B.S. degree or equivalent in computer science; computer engineering M.S. equivalent preferred; 2 years of processing experience w/ main frame computers, 1 year experience on LRPD system IBM working knowledge of IBM S/term-360; MYSA-KAL, CLIST, TSO, DFSDFP, SOCF, OS-JCL, CICS, R, DPL, ZIM, G, GENHRC, Assembler, VSAM, DB2, ACPRETER, ACPRETER, COMSTW, W, Perked 4.2; DCF/Series, Data Writer/370; MVS/VSE, J98, 3, BTSI, DB 2 (SQL, QMF), CIMS/DGT 40 minnow Sale 327.16/yfr. Send resumes to Hens Job Agency, 715 Front St., Helena, Montana 59601. Referral Job #09-A-1727200

[illegible]

CONSULTANTS

NEW DEVELOPMENT FOR \$299

- PEOPLESOFT®
- POWERBUILDER™

MANAGERIAL DBS/CICS
DB2/IE/VS DB2/CICS DB
PLI DB2/BAAA Managerial
CICS/Portfolio PLI/CICS
SAS Data Mgmt. DBMS
PC's Gupta/SQI Software For
Net/Asynch CISC/C++-PM
MANAGEMENT Systems Development
Systems DBA Mgmt./Lan/WAN
SmartSoft Tester Sys Admin
Data Mgmt. DBMS
WAL: Proj ID A/E/0680 Syntex

RRA Sales Representative
12124 Jct. HWY 8, BOX 100
900-336-5995
212-975-1209
Fax 212-362-0263

SOFTWARE ENGINEER - 4
hrs./wk., 8am-5pm, \$40,000/yr.
To analyze, design and develop systems software and application software. Carry out porting of systems from IBM mainframes to OS/2 PCs. Require Bachelor's Degree in Electronics Engineering or Computer Science, 3 years experience in job offered or years experience as Systems Analyst. Must have good experience with IBM 3090, PC, CICS, OS/2, SAA and LU 6.2. PLUS: Employer paid auto. Send resumes to: 7315 Woodward Ave., Rm. 415, Detroit, MI 48202 Ref No: 92992 E.O.D.

KANSAS CITY

ATC/VIDEO *applied*
improved placement of joints
immediate openings now R
EP 6100 or Construction
if new, experienced
CONROL w/VIDEO/2
DRAK GUPE
CONROL FIBER/5 or CASE
CONROL Fibre Programmer
CONROL Fibre or CON
MANAGEMENT Development
LANHAN Networking
AS400 SYMON

Send your resume in
confidence to:
ADRI
P.O. Box 26342
Shoreline, Michigan
Phone 923-2342
or Fax (313) 864-9837
Tel 1-800-775-4177

*Not available outside U.S.A. only

100

Senior Software Engineer - 40 hrs/week, \$60,000.00 per yr. To develop, test, support and maintain application systems on IBM 3080 and AS/400. Must have 5 yrs. exp. in TELCO, CISC, CBL, SDA, and/or COBOL. If language VSE/ESA operating system and/or assembler is desired in lieu of COBOL, must have 10 yrs. exp. in COBOL. 5 yrs. exp. in IBM 3080 or AS/400. 2 years experience as a Computer Associate in IBM or IBM Corp. Must have exp. with IBM mainframes, COBOL, CISC, COBOL, R, and SDA. Employer sends resumes to: Mr. J. J. O'Connell, IBM, 415, 1st St., St. Louis, MO 63102. Ref No. 9108.

SYSTEMS PROGRAMME INSTRUCTORS

If you possess the ability to communicate your skills to others and desire to travel and continue education, then read on. We're offering a variety of training packages, a career opportunity, and a chance to continue your education. It is exciting, rewarding, and a chance to work with some of the best course developers with a view to the following areas:

- VTAM/RSX/NETVIEW
- VSAM and DC/DC/VS
- C and C++

Some training will be provided. Resumes or Call:

PERSONNEL, Verbal info on Postings, Int. 253 Pm, Fax, 609-426-0000

1-800-831-0410

Look no further for professional growth. And you can find your regional recruitment office at **Careers**.

343-647
col sales

BOSTON
MA 01

NEW
Rochelle

WASH
Fairfax

CHICA
Rose m

COMP
We're the quality

Looking for qualified computer professionals?

Look no further. More than 629,000 computer professionals read *Computerworld* every week. And you can reach all of them -- or just the ones in your region -- with a regional or national recruitment advertisement in *Computerworld's* Computer Careers section.

For more information, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700); or call your local sales office listed below:

BOSTON: 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171. Nancy Percival. 508-879-0700

NEW YORK: Mack Center 1, 365 West Passaic St.,
Rochelle Park, NJ 07662, Valerie Galbo, 201-587-0090

WASHINGTON, D.C.: 8304 Professional Hill Drive,
Fairfax, VA 22031. Katie Kress, 703-573-4115

CHICAGO: 10400 West Higgins Road, Suite 300,
Rosemont, IL 60018, Patricia Powers, 708-827-4433

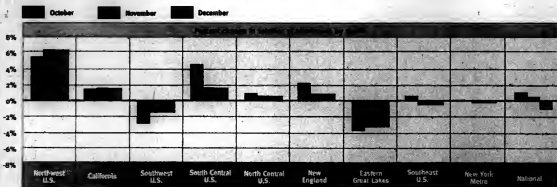
LOS ANGELES: 18008 Sky Park Circle, Suite 145
Irvine, CA 92714, Barbara Murphy, 714-250-0164

SAN FRANCISCO: 18008 Sky Park Circle, Suite 145,
Irvine, CA 92714. Barbara Murphy, 714-250-0164.

COMPUTERWORLD
Where the qualified candidates look. Every week.

Computerworld/Computerworld/Care

The West's new employee growth has outperformed all other regions and the national average.



© Copyright 1993, Corporate Technology Information Services, Inc., Woburn, Mass.

CONSULTANTS
SHOULD CONSULT

and Consulting Associates
are the top professionals
in the industry & are
now looking for a
Senior Project Manager
(72) 456-1755
Fax (714) 456-1754

TANDEM

East Coast/Florida/Georgia
Junior & Senior Pk's & S's & S's
Senior & Project Manager
Marketing, Engineering, Telephony
Manufacturing, Control & Control
PATHWAY SCHOOL, CORP.
New York, NY, TEL: C 800
BASE IN CLEVE GA, USA

Send your resume to:
TANDEM

Phone: 714-456-1755

13000 Oreg New Lane

920 108-4101

800 726-1427

Seeking Only Tandem Users &

Professionalism Across the U.S.

TALON

Professionalism Across the U.S.

13000 Oreg New Lane

920 108-4101

800 726-1427

Seeking Only Tandem Users &

Professionalism Across the U.S.

ANALYST/PROGRAMMER

Professionalism Across the U.S.

13000 Oreg New Lane

920 108-4101

800 726-1427

Seeking Only Tandem Users &

Professionalism Across the U.S.

PROGRAMMER ANALYST

Professionalism Across the U.S.

13000 Oreg New Lane

920 108-4101

800 726-1427

Seeking Only Tandem Users &

Professionalism Across the U.S.

RECRUIT THE BEST!

Professionalism Across the U.S.

13000 Oreg New Lane

920 108-4101

800 726-1427

Seeking Only Tandem Users &

Professionalism Across the U.S.

RECRUIT THE BEST!

Professionalism Across the U.S.

13000 Oreg New Lane

920 108-4101

800 726-1427

Seeking Only Tandem Users &

Professionalism Across the U.S.

RECRUIT THE BEST!

Professionalism Across the U.S.

13000 Oreg New Lane

920 108-4101

800 726-1427

Seeking Only Tandem Users &

Professionalism Across the U.S.

RECRUIT THE BEST!

Professionalism Across the U.S.

13000 Oreg New Lane

920 108-4101

800 726-1427

Seeking Only Tandem Users &

Professionalism Across the U.S.

RECRUIT THE BEST!

Professionalism Across the U.S.

13000 Oreg New Lane

920 108-4101

800 726-1427

Seeking Only Tandem Users &

Professionalism Across the U.S.

CONTRACTORS
ALL TECHNICAL SKILLS

NATIONWIDE
RECRUITMENT

Maximize your earnings and
your billing rate. We mail your
resume to lenders nationwide
at no cost to you.

Send your resume to:

JCL Enterprises, Inc.

270 North Collins, Suite 100

Channahon, IL 60610

TEL: (708) 232-9232

Or Call: 1-800-257-2545

CONSULTANTS/PT

Professionalism Across the U.S.

13000 Oreg New Lane

920 108-4101

800 726-1427

Seeking Only Tandem Users &

Professionalism Across the U.S.

SAGE SOLUTIONS

Professionalism Across the U.S.

13000 Oreg New Lane

920 108-4101

800 726-1427

Seeking Only Tandem Users &

Professionalism Across the U.S.

SMALLTALK

Professionalism Across the U.S.

13000 Oreg New Lane

920 108-4101

800 726-1427

Seeking Only Tandem Users &

Professionalism Across the U.S.

TANDEM

Professionalism Across the U.S.

13000 Oreg New Lane

920 108-4101

800 726-1427

Seeking Only Tandem Users &

Professionalism Across the U.S.

COROL

Professionalism Across the U.S.

13000 Oreg New Lane

920 108-4101

800 726-1427

Seeking Only Tandem Users &

Professionalism Across the U.S.

STATUS

Professionalism Across the U.S.

13000 Oreg New Lane

920 108-4101

800 726-1427

Seeking Only Tandem Users &

Professionalism Across the U.S.

MUMPS

Professionalism Across the U.S.

13000 Oreg New Lane

920 108-4101

800 726-1427

Seeking Only Tandem Users &

Professionalism Across the U.S.

STRATEM

Professionalism Across the U.S.

13000 Oreg New Lane

920 108-4101

800 726-1427

Seeking Only Tandem Users &

Professionalism Across the U.S.

RECRUIT THE BEST!

Professionalism Across the U.S.

13000 Oreg New Lane

920 108-4101

800 726-1427

Seeking Only Tandem Users &

Professionalism Across the U.S.

RECRUIT THE BEST!

Professionalism Across the U.S.

13000 Oreg New Lane

920 108-4101

800 726-1427

Seeking Only Tandem Users &

Professionalism Across the U.S.

Now you can access Computerworld's new Careers On-line bulletin board!

Just dial 508 879-4700 with your computer and modem and you can access the most up-to-date computer job listings available!

COMPUTERWORLD



SOFTWARE ENGINEER

Professionalism Across the U.S.

13000 Oreg New Lane

920 108-4101

800 726-1427

Seeking Only Tandem Users &

Professionalism Across the U.S.

RECRUIT THE BEST!

Professionalism Across the U.S.

13000 Oreg New Lane

920 108-4101

800 726-1427

Seeking Only Tandem Users &

Professionalism Across the U.S.

SYSTEMATICS PROFESSIONALS

Join the Logica systems consulting team.

- Project Managers
- Senior Analyst / Programmers
- Senior Business Systems Analysts

Assignments in U.S.A. and International

Logica North America Inc. enjoys a worldwide reputation in technical and business systems consulting and training for the financial services industry.

Due to rapid business expansion, Logica North America Inc. has consultancy positions available for Project Managers, Senior Analyst / Programmers and Senior Business Systems Analysts with "hands-on" experience in a SYSTEMATICS environment and with a solid understanding of the banking business. Our consultants are involved in all activities related to the implementation of banking systems. This includes feasibility studies, analysis, design, program development, testing, training and support.

We are seeking committed level professionals with a minimum of 6 years' IBM Mainframe experience, who understand the retail banking business functions and have at least 4 years of experience in SYSTEMATICS applications. Candidates must be able to travel and be available for short and long term assignments in the United States and/or International sites.

We offer an excellent salary, travel package and comprehensive benefits. Please send resumes to: Recruitment Manager, Logica North America Inc., 8801 Avenue of the Stars, Suite 1415, Los Angeles, CA 90067. FAX: (310) 765-0505.

An equal opportunity employer, M/F/D/V.

Logica North America Inc.



COMPUTER CONSULTANTS

Helping You Grow
If you are interested in a contract for 1993
call us today to see what we can do for you.

- | | | |
|-----------------|---------------------|-----------------|
| IBM | • Assembly Software | • VMS/C |
| • Tandem | • CISC: Pcs, Mac | • VMS/C |
| • Pcs | • Macro/CODE | • IBM |
| • PERFORM/Tools | • AS/400 SYSTEM | • PERFORM/Tools |
| • Visual BASIC | • BASIC/COBOL | • BASIC/COBOL |
| • IBM C++ | • C and C++ | • C and C++ |
| • PACBases | • Pascal | • Pascal |
| • Remit LAN | • MATA | • MATA |

PO Box 1724, St. Louis, MO 63103

(314) 644-1724 FAX: (314) 644-1724

NA/CSC Member

CASE CONSULTANTS

Front End (SAP, BPR, BAA, JAD)

Back End (SAP, TO, CC, UNIC, ORACLE)

Support (O.A.'s, Instructors, Support)

For resume or call

CHRISTOPHER DICKEY
LOGAN BRITTON

9230 LB #990

Dallas, TX 75243

1-800-363-4351

FAX 214-437-4983

3800 So. Glenview #203

Houston, TX 77062

1-800-363-4352

FAX 713-366-6553

Every week Computerworld delivers more qualified job candidates than any other newspaper.

That's why more companies place more recruitment advertising in *Computerworld* than in any other specialized business newspaper.

To place your ad, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700).

Weekly, Regional, National.
And it works.



Analysts and Programmers

Excellent Opportunities in Banking Software Applications

The Technology & Banking Operations Division of M&T Bank in Buffalo, has exceptionally challenging opportunities available for candidates with 3-5 years' Project Management/Analysis & Design experience.

The candidates we seek should have solid working knowledge in one or more of the following disciplines: Hogan IDS architecture (TDA & DDA), IRS year-end reporting systems (preferably DISC, DIS), Credit Card processing systems, Vector 3000 (DDA built file) or Vector 5 (Returned Deposited Items) application systems. Additionally, we are looking for candidates with a strong background in branch automation software products and PC LAN technology. BANCSTAR, Starburst, PC File II, WordPerfect, C++ Language and PAS. An IBM/AT/XT/PS JCL environment along with COBOL, CICS, VSAM, TSO/ISPF are required. Easytrieve Plus, and Basic Assembler language are plus factors. Excellent communication and human relations skills required, degree preferred.

Salaries are commensurate with experience and accompanied by a Flexible Benefits plan. Qualified candidates should submit a cover letter, resume and salary history to: M&T Bank, Human Resources, Department JMH1, One M&T Plaza, Buffalo, NY 14203. An equal opportunity employer M/F/D/V.

Manufacturers & Traders Trust Company (M&T Bank) is a subsidiary of First Empire State Corporation, a \$10.6 billion regional bank holding company headquartered in Buffalo, NY and employing more than 4,200 people in offices throughout New York State, Ohio and Pennsylvania.



The State-of-the-Art in the State-of-Great-Living!

INFORMATION ENGINEERING PROFESSIONALS

You really can have the best of both worlds...a sophisticated and challenging work environment and an ideal lifestyle in beautiful, sunny Miami, the South's hub for culture, recreation, and diversity!

With John Alden Systems Company, a subsidiary of John Alden Financial Corporation, a respected leader in the small group health insurance and financial services industry, you'll be involved with the latest protocols and technology. We utilize CASE (ADW), Client Server, large scale applications, DB2, Novell, LANs, and WANs, and we're continuously expanding our leading-edge environment. Currently, we seek the following motivated, solution-oriented professionals to join our dynamic teams working with AD Method, Knowledgeware and Project Work Bench.

- PROJECT MANAGERS
- SOFTWARE ENGINEERS
- TEAM LEADERS
- PROGRAMMERS

You'll participate in selecting and developing client server tools, databases, applications and platforms. To qualify, you will need a Bachelor's degree in Computer Science, 3-5 years experience working with financial or insurance systems, and proven success in business process re-engineering concepts.

In return for your expertise and commitment, we offer outstanding compensation (WITH NO STATE INCOME TAX!), excellent benefits, and performance-based growth potential. For confidential consideration, please send your resume with salary requirements to: John Alden Systems Company, Personnel Generalist, P.O. Box 008270, Miami, FL 33102-0270. An equal opportunity employer.



Marketplace



Are you paying too much for PC repairs?

If you treat it right, a well-maintained PC will give your company at least six years of hard service. Nevertheless, sometimes technicians may want you to think otherwise. Be wary when you see their technicians say:

- "Your hard disk sounds... weird."
- "Your floppy drive is noisy."
- "They are all noisy."
- "Your hard disk cables look odd."
- "Your power supply may be overloaded."

By Todd Henschel



Have you noticed that every PC repair, no matter how small, launches into a system overhaul or requires your PC to disappear into the service shop indefinitely? If your answer is yes, take heed. Your service technician may be making more money off of you than he really is.

One of the more common ways to add profit to a job is through small, unnecessary repairs. If the technician says, "While I was in there, I saw X was getting a little X so I put in a new one," it's probably going to cost you.

It's usually something like a \$10 cable, but I've even picked "lousy" floppy drives out of wastebaskets that only needed to be cleaned.

I've also seen hard drives replaced that only needed a free low-level format. This is especially true of the MFM and RLL drives inside most older machines.

A less expensive way to handle the hard disk problem is to use software utilities such as Gibson Research Corp.'s SpinRite II, which helps identify damage and repair data and low-level format damage on standard hard disks. If your in-

house staff doesn't have the time to run this type of utility, have your technician run it once a year on every machine—but not before backing up your hard drive. With disks costing \$300, it makes good sense to spend a few bucks to prevent the drive from giving you any grief.

If you've been noticing that parts and service prices change radically from visit to visit, you'd better check into that, too. Some technicians don't have a set fee. I've seen \$50 floppy drives billed from \$75 (the

usual end-user cost) to \$175. Check the last invoice and see how much things used to cost. If inspection and cleaning was \$50 last month and \$130 this month, something's up, and it's probably the technician's bank balance.

If it ain't broke...

Another affliction that repairmen are prone to is upgrading. Most techs enjoy working on state-of-the-art systems with lots of random-access memory, fast hard disks and

so on, but a lot of corporate machines have one foot in the digital grave. There are what techies like to call "dead anchors."

Technicians groan when they open these ancient boxes and see a bog-slow, 20-Mbyte Seagate hard disk, and they mumble how nice it would be if it had a fast, 100M-byte, integrated drive electronics hard disk instead.

Maybe they see a problem that isn't as bad as they think, but fixing it will get a faster disk in there, and that's good, right?

Wrong. If your system does what you need, resist the urge to upgrade it just because it's old. Remember, some technicians sell computers.

One final check is to ask if quality parts have been installed. This may be hard to detect, but you should ask anyway.

For instance, repairmen can buy Tenc America, Inc.'s floppy drives for about \$50. Mitsumi Electronics Corp.'s drives go for as low as \$25 to \$30. If they sell you a Mitsumi, which is of lesser quality, you'll still pay \$75 for the drive. Of course, if the system is old and only under light duty, a cheaper part might be acceptable.

Henschel is a PC consultant, technician and free-lance writer in Burbank, Calif.

How to avoid excessive service bills

■ Was anything repaired because it "looked bad"? Get a better explanation.

■ Your technician won't explain things or show you what's wrong? Fire him.

■ Are service prices changing more than the weather? Check your last invoice.

■ Is the repair person doing work you didn't ask to be performed? Ask why.

■ Are all repairs and parts itemized on the bill? Why not?

■ Is your PC going to the repair shop a lot? It's probably costing you more money because you pay for the pickup, attempted repair, bench time and delivery return. Find someone who has a tool bag and knows how to use it. Most repairs can be done on the spot—even something as complex as putting in a new motherboard.

—Todd Henschel

Buy/Sell/Lease

TAKE NO RISK ON RISC SYSTEM/6000

Choose: **DATA TREND**

RISC System/6000 Hardware:

RISC System/6000 Services:

RISC System/6000 Engineering:

Enterprise Services

Enterprise-wide planning, Host Connectivity, Process Control, RDBMS Incorporation, Complex Systems Integration, Complex Solutions, DAE Incorporation

Complete systems, upgrades, trades, peripherals, parts Service/1 to RS/6000 Migration, AIX Support/Consultation, Application Re-engineering, Consolidation Services, Data Conversion Services Custom Re-configuration, Refurbishment, Complex Systems Integration, Cable Systems Design/Installation, Field Installation, Board Level Repair, Project Packing Services, Configuration Documentation

BUY • SELL • LEASE

Series/1

System 36-38

AS/400

937X, 4300, 468X

PS/2, Industrial PC

Call the "Reliability Company"

1-800-FOR-RISC

(1-800-357-7472)

612 942 9930

10250 Valley View Rd., Suite 148, Edgemoor, MN 55344

REMEMBER...

DataTrend is also World Leader in Series/1

CDLA

Processors Peripherals Upgrades

BUY • SELL • RENT • LEASE NEW/USED EQUIPMENT

IBM
AS/400,
ES/9000,
RS/6000,
System/68,
and more...

SPECTRA

A full line computer dealer

(800) 745-1233

Anahim Corporate Center 5101 E. La Palma Ave., Anaheim, CA 92807

(714) 970-7000

(714) 970-7000

Solutions Directory

A listing of professional services providers.

ACCTG SOFTWARE/SERVICES

Arthur Eltinger & Co.
Arlington Heights, IL (708) 506-0555

BANKING/FINANCIAL

Acme Banking Systems
Springfield, MO (417) 881-5057

Automated Systems Inc.
Scottsdale, AZ (602) 333-3636

Barium Systems Inc.
St. Cloud, MN (612) 251-3060

Cisco
Irvine, CA (714) 563-0792

Computer Assist.
West Hartford, CT (203) 521-3264

Cybor, Inc.
Eagan, MN (612) 833-6864

DH Computing Services Inc.
Provo, UT (801) 373-8516

Detroit, Inc.
N. Canton, OH (216) 469-4000

Early, Cloud, & Co.
Newport, RI (401) 849-0500

EDS
Benton, OH (614) 423-9501

EFRI
Hawthorne, NJ (516) 752-0585

Financial Technologies, Inc.
Denver, CO (303) 691-5190

Information Technology, Inc.
Littleton, NE (402) 421-4217

Integrated Data Systems Inc.
Los Angeles, CA (310) 478-0135

Logica North America, Inc.
Waltham, MA (617) 850-7730

National Computer Systems Inc.
Eden Prairie, MN (612) 929-3000

Selection, Inc.
Danvers, MA (508) 777-5022

SNAP Software, Inc.
Minneapolis, MN (612) 833-5677

Software Alliance Corp.
Berkeley, CA (510) 548-7759

Systems Corp.
Miami, FL (407) 875-1234

Surquard Trust Systems Inc.
Charlotte, NC (704) 527-6300

The Capital Group Inc.
Canton, CT (216) 436-2677

BAR CODE/DATA COLLECT SYS

General Business Systems Inc.
Milford, CT (203) 874-8199

CLIENT SERVER DEVELOPERS

Linc Systems Consulting & Training
Bloomfield, CT (203) 296-0060

Power-Civ (PowerBuilder VAR)
Tempe, FL (613) 261-2990

Linc Systems Consulting & Training
Bloomfield, CT (203) 296-0060

CONSUMER PKG GOODS

Information Resources
Watson, MA (617) 890-1100

CUSTOMER SERVICE

RE SPECTRUM ASSOCIATES
Watson, MA (617) 892-0932

DATA CNTR DESIGN/MGMT

21st Century Innovations Inc.
Aliso Viejo, CA (800) 327-4527

EDUCATION

Datatel, Inc.
Fairfax, VA (703) 968-9000

James Martin Institute
Nashville, TN (615) 963-4068

Penetration Enterprises Inc.
Bethlehem, PA (215) 691-3616

ELECTRONICS

Genrad, Inc.
Milwaukee, WI (508) 369-4400

ENGINEERING

Parametric Technology, Inc.
Waltham, MA (617) 894-7111

Tetradine, Inc.
Boston, MA (617) 462-2700

GENERAL BUSINESS

AmerData, Inc.
Minneapolis, MN (612) 557-2500

AVNET Computer
Culver City, CA (310) 558-2863

Bedford Computer Systems, Inc.
N. Billerica, MA (508) 867-0250

Bohann Associates, Inc.
Gaithersburg, MD (301) 298-2965

Computer Cable Co.
Bow, NH (603) 226-1801

Continental Resources, Inc.
Bedford, MA (617) 275-0850

Gravite, Inc.
Alameda, CA (510) 789-2800

Kimrough Computer Sales, Inc.
West Ridge, CO (303) 425-0863

Lynch, Mares, & Associates, Inc.
Beverly, MA (510) 844-2821

National Products, Inc.
Clematis, FL (813) 442-6400

National Tech Team, Inc.
Dearborn, MI (313) 277-2277

Ross Systems HP
Waltham, MA (617) 622-1414

Senior Business Systems, Inc.
Cincinnati, OH (513) 874-3199

Twiss Software, Inc.
Hoboken, NJ (508) 435-3035

Viet Systems Distribution
Cambridge, CA (619) 431-2500

GOVT/MUNICIPALITIES

Central Federal Systems, Inc.
Reston, VA (703) 756-7000

Arthur Eltinger & Co.
Arlington Heights, IL (708) 506-0555

Feltz Church, VA
Duxbury, MA (617) 834-0949

HTE, Inc.
Orlando, FL (407) 841-3235

Marathon, Inc.
Kalamazoo, MI (616) 373-5300

Moore Research Industries
Falls Church, VA (703) 573-9538

Network Computing Corp.
Charlotte, NC (704) 525-8810

Power-Civ
Burlington, MA (617) 229-2200

HEALTH CARE

Ameritech
Lafayette, CA (415) 481-5374

Automation Research Systems, Ltd.
Alexandria, VA (703) 624-6400

OS Technologies, Inc.
Tulsa, OK (918) 496-2451

Collaborative Medical Systems, Inc.
Newton, MA (617) 564-7880

Computer Methods Corp.
Livonia, MI (313) 522-5187

Continental Healthcare Systems, Inc.
Overland Park, KS (913) 451-6151

Cygnus Systems, Inc.
Scottsdale, AZ (602) 596-4300

DRM Systems Inc.
West Des Moines, IA (515) 225-6744

First Data Corp.
Chicago, IL (704) 549-7000

General Computer Corp.
Twinburg, OH (216) 425-3241

Healthcare Services

Medvia, NY (516) 293-4111

Infodent, Inc.
Princeton, NJ (609) 987-8181

Instrumentation Laboratories
Lexington, MA (617) 861-0710

Interflex, Inc.
Waltham, MA (617) 290-0710

Kenne, Inc.
Boston, MA (617) 241-9200

Kurzweil Applied Intelligence, Inc.
Waltham, MA (617) 893-5151

Management Systems Associates
Raleigh, NC (919) 851-6177

Medaphs Physician Services Corp.
Atlanta, GA (404) 319-3300

Medic Computer System, Inc.
Raleigh, NC (919) 847-8102

National Medical Computer Services, Inc.
San Diego, CA (619) 566-9800

PHARMAS, Inc.
Seattle, WA (206) 622-9556

Poulsen-Douglas Corp.
Portland, OR (503) 245-5555

Pyrite Clinical Systems, Inc.
Pasadena, CA (818) 449-1705

Professional Health Care Systems, Inc.
Los Angeles, CA (213) 578-7000

Servpro Software, Inc.
Minneapolis, MN (612) 823-4036

Source Data Systems, Inc.
Cedar Rapids, IA (319) 363-3343

Synetics Corp.
Westwood, MA (617) 245-9090

Versys, Inc.
Westwood, MA (617) 461-9400

Carl Zeiss, Inc.
Trompsburg, NY (614) 747-1800

INSURANCE

Agema Corp.
Seattle, WA (206) 525-0005

Agency Management Services, Inc.
Norwell, MA (617) 952-9400

Datoh Information Systems, Inc.
Westlake Village, CA (818) 706-8989

Input Output Computer Services, Inc.
Waltham, MA (617) 880-2299

Instrumet, Inc.
Emeryville, CA (510) 652-3771

SI Systems, Inc.
Andover, MA (508) 852-5000

Sigma Imaging Systems, Inc.
New York, NY (212) 476-3000

Strategic Data Systems, Inc.
Shelbyville, TN (414) 459-7999

IMAGING

Burns Consulting Group
Schaumburg, IL (617) 962-1986

Laser Recording Systems, Inc.
Mountain Lake, NJ (201) 402-9500

LIBRARIES

CLSI, Inc.
Newtown, MA (617) 955-6310

MANUFACTURING

Ask Computer Systems, Inc.
Mountain View, CA (415) 969-4442

Ball Atlanta Software Systems, Inc.
Sudbury, MA (508) 443-7311

Dial, S Systems
Santa Rosa, CA (714) 282-6422

Expanding Software, Inc.
Santa Cruz, CA (408) 261-7880

GE Consulting Services, Inc.
Hockley, MO (301) 340-5000

Garber Scientific Instrument Co.
St. Windsor, CT (203) 644-1551

Northwest Data Systems, Inc.
Burlington, MA (617) 273-8620

Northwest Research & Engineering
Watson, MA (617) 935-4050

Man-Tek, Inc.
Concord, CA (510) 685-2868

Marcum, Inc.
Newton, MA (617) 865-0220

Neari Corporation, Inc.
Tewksbury, MA (508) 640-0840

Micro-MPP
Concord, CA (415) 345-6000

Pascal-Rad, Inc.
Westford, MA (508) 882-4000

Software Horizons, Inc.
Burlington, MA (617) 273-4711

RE SPECTRUM ASSOCIATES
Watson, MA (617) 932-0932

Symetrix, Inc.
Lexington, MA (617) 862-3000

The Peak Technologies Group, Inc.
Columbus, MA (410) 982-8922

Waters
Marlboro, MA (508) 624-4450

MANUFACTURING SOFTWARE

Effective Management Systems
Minneapolis, MN (612) 359-8000

North Coast Automation, Inc.
Burlington, MA (617) 473-3600

RETAIL

Concep Systems, Inc.
San Antonio, TX (512) 340-8253

Concept Systems, Inc.
Philadelphia, PA (215) 563-1425

Data Systems, Inc.
Irvine, CA (619) 813-1620

Datasec, Inc.
Eden Prairie, MN (612) 829-8000

Datatec Industries
Fairfield, NJ (201) 808-4000

Real Store Systems, Inc.
Winnipeg, RI (401) 732-3323

SECURITY

Redondo Beach, CA (310) 372-4642

SOFTWARE DEVELOPERS

Cadre Technologies, Inc.
Providence, RI (401) 351-5850

Skatstone Corp.
Plymouth, CT (203) 425-1875

Vanguard Software
Hudson, MA (508) 562-7711

SCHEDULING/PLANNING

Summit Solutions, Inc.
Overton, IN (219) 929-4189

TRAINING

Carl & Angila, Ph.D., Inc.
Louisville, KY (800) 347-6903

UTILITIES

Environmental, Inc.
Bedford, MA (617) 275-0000

QASS Technology, Inc.
Orland, CA (905) 895-1020

WHOLESALE DISTRIBUTION

Daly & Watson, Inc.
W. Loop Hwy, CA (401) 823-8400

Dynamic Data Systems, Inc.
Westminster, CO (303) 426-0048

Arthur Eltinger & Co.
Arlington Heights, IL (708) 506-0555

National Distributor Systems, Inc.
Stretford, CT (203) 376-8010

SI Hardware Systems, Inc.
Easton, PA (215) 252-7321

136 COMPUTERWORLD DECEMBER 28, 1992/JANUARY 4, 1993

Companies in this issue

Page number refers to page on which story begins

3Com Corp.	139	Dean Witter	14,30	K	Service Quality Institute	29	
A		Dell Computer Corp.	72,87	Kanbi & Curry Stores, Inc.	31	Servo Corp.	27
Aberdeen Group	113	Deloitte & Touche	30	Kay Wholesale Drug Co.	103	SHL Systems, Inc.	6,128
Above Software, Inc.	89	Dallas Air Lines	158	Keyfile Corp.	80	Shore Beach Software, Inc.	77
Acknowledge, Inc.	118	Department of Defense	95	Kidder Peabody & Co.	139	Software AG of North America, Inc.	113
Action Technology, Inc.	87	Department of Justice	138	Kimberly-Clark Corp.	16	Software Publishers' Inc.	129
Adaptive Corp.	93	DHHS & Associates	34	KnowledgeWare, Inc.	67, 116, 138	Sony Corp.	95
Adobe Systems, Inc.	83,83	Digital Equipment Corp.	25, 27, 34, 42, 43, 67, 72, 94, 102, 103, 110, 113, 114, 139	L	SoundView Financial Group, Inc.	95, 97	
Advanix	10, 42	Associates, Inc.	136	Legend Corp.	6, 67, 114	SPARC International	27
Affiliated Computer Systems, Inc.	41	Digitalink	37, 41	Lexnet Systems International, Inc.	85	Spectrum Information Technologies, Inc.	37
AGS Computers, Inc.	139	Dynegy Corp.	20, 33	Levi Strauss & Co.	27, 31	SRI Research	34
Al Corp.	27	Eastman Kodak Co.	8, 35, 130	Lexmark International, Inc.	85, 95	St. Agnes Medical Center	91
Advan Corp.	27	Electronic Data Systems Corp.	8, 42, 72, 87, 113	Lotus Development Corp.	25, 41, 67, 113, 138	StarVox, Inc.	130
Alco, Brown & Sons, Inc.	41, 67	Employer's Health Insurance	13	M		Storage Technology Corp.	100
Amulsoft Corp.	43, 67, 138	Employer's Resource Corp.	20	Madge Networks, Inc.	85	Stratus Computer, Inc.	41, 94
American Airlines	27, 113, 139	Envision Corp.	41	Major Intelligence Research Corp.	30	Sun Microsystems, Inc.	20, 34, 67, 85, 113, 114, 138
American Medical Association	87	Envision Corp.	41	Mass Optical Storage Technology, Inc.	63	Sun-Link, Inc.	20
American National Standards Institute	113	Envision Corp.	41	Matsumoto Electric Industrial Co.	34	Synapse, Inc.	72
Anderson Consulting	9, 42, 109, 139	Envision Corp.	41	Maya Foundation	34	Synet Technology	67
Annex Research	43	Envision Corp.	41	McCauley Cellular Communications, Inc.	8	Synetics, Inc.	94
Apertus Technology, Inc.	139	Envision Corp.	41	Memorex Telen Corp.	5	Syntronics Ltd.	104
Aplica Technology, Inc.	69	Envision Corp.	41	Meta Group, Inc.	139		
Apple Computer, Inc.	27, 34, 67, 77, 83, 102	Envision Corp.	41	MicroAge, Inc.	139	I	
Applix, Inc.	138	Envision Corp.	41	Microvision, Inc.	130	Idaptive Technology, Inc.	85
Armstrong World Industries, Inc.	34	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Array Technologies, Inc.	103	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
ARST Research, Inc.	67, 138	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
AT&T	6, 13, 67, 138, 139	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
At In Print, Inc.	8	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Avatar Corp.	109	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
ArtTech Software, Inc.	109	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
B		Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Bank South Corp.	8	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
BankAmerica Corp.	8	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Bank Trust Co.	8	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Banyan Systems, Inc.	67, 87	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Battle Brothers, Inc.	77	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Bechtel Steel Corp.	138	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Beyond, Inc.	29	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
BIS Strategic Decisions	25, 30	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Biscom, Inc.	29	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Borglund International, Inc.	29, 30, 41, 67, 72, 75	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Brookview Corp.	86	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Brookview Technology, Inc.	29	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Browning Ferris Industries	29	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
BT	18, 94	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Burlington Coat Factory, Inc.	6	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Businessland, Inc.	6	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Business Research Group	138	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Bayer California	30	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
C		Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Cabletron Systems, Inc.	25, 30	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Camaro Research	29	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Cardinal Freight Corp.	29	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Case Manufacturing Bank NA	41	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Chipscom Corp.	102	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Cigna Corp.	17	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
CIIM Corp.	89	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Cincinnati Bell Information Systems, Inc.	8	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Cisco Systems, Inc.	83	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Citibank NA	113	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Citicorp	27, 31	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Clarity, Inc.	39	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Compaq Computer Corp.	27, 41, 67, 82, 83, 102	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Compatible Systems	103	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Computer Associates International	103	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
ComputerLand Corp.	139	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Computer Measurement Group	103	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Computer Solutions, Inc.	41	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Conquest & Lybrand	87	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Conrad Networks, Inc.	90	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Coral Technologies	113	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Creative Strategies Research International, Inc.	20	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
CSX Corp.	27	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
D		Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
Data General Corp.	90, 113	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94
D&B Software	34	Envision Corp.	41	Microvision Corp.	130	Imation Corp.	41, 94

DEC breaks out business units

As expected, Digital Equipment Corp. has established vertical-market business units and has named leaders for five of its nine organizations. The following vice presidents were appointed: Larry Cabrineta of components and peripherals; Charles Christ of storage; Frank McCabe of discrete manufacturing and defense; John Rando of multivendor customer services; and William Shire of health industries. Managers of the PC, financial, professional and public services, communications, education and entertainment, and consumer and process manufacturing business units will "be appointed shortly," a DEC spokesman said. DEC also gave a senior vice president responsibility for the company's newly created Office of Ethics & Business Practices.

SCO president steps down

The Santa Cruz Operation (SCO) President Larry Nichols has resigned after facing mounting allegations that he sexually harassed five female employees. In a lawsuit and complaints to state authorities, the women charged they were being repeatedly groped, propositioned and forcibly kissed by Nichols at work since 1981. Although Nichols, 61, has maintained his innocence, he claimed the allegations were too serious to allow him to stay. Nichols has been replaced by Jim Harris, a member of the SCO board.

ISSC racks up more deals

IBM's Integrated Systems Solutions Corp. (ISSC) subsidiary has signed a 10-year outsourcing agreement with Norrell Corp., an Atlanta health care and administrative services provider. ISSC will handle data processing, data center management, applications development, help desk, print operations and business recovery services. The Norrell deal came one week after ISSC disclosed a 10-year deal with retail chain owner Hock-Supple, Inc. ISSC is consulting to Hock's Indianapolis, Cincinnati and Fortworth, R.I., data centers into an ISSC facility in Lexington, Ky. ISSC will also install and maintain point-of-sale systems. The value of the deals was not disclosed.

Court amends CA/Altai ruling

The U.S. Court of Appeals for the Second Circuit in New York has amended a June ruling in the ongoing Computer Associates International, Inc./Altai, Inc. legal battle [CW, June 29]. The court now says CA has a "viable trade-secret claim" against Altai, although the latter's software did not infringe upon CA's copyrights. CA had alleged that Altai used CA's trade secrets to create Oscar 3.3, a mainframe software scheduler.

SHORT TAKES Wang Laboratories, Inc. reported a first-quarter 1993 net loss of \$68.6 million, including a \$29 million costline charge for layoffs and other items related to the firm's Chapter 11 restructuring. Sales for the period dropped 22%, to \$360 million, from \$461 million a year ago. ... Federal arbitrators have voided the U.S. Air Force's twice-protested \$740 million Desktop IVPC supply contract awarded to Zenith Data Systems in September. ... DEC is planning to resource customers during the week of Jan. 4 as its Pathworks for Novell, Inc.'s NetWare product is alive and well — if not as far along (toward commercial availability) as we would like. ... A DEC spokeswoman said. Indeed, one prominent beverage maker is still waiting for a beta-test version of the product, which was expected last summer. ... A spokesman said. ... Intel Corp. acknowledged that it will be at least a year before it ships Rank-memory devices announced in April. ... Digital Communications Associates, Inc. in Alpharetta, Ga., has agreed to acquire Avatar Corp., a Hopkinton, Mass., Macintosh-to-mainframe software vendor, for \$5 million.

News

Novell takes Unix gambit

USL buy would ready company for battle with Windows NT

By Maryann Johnson
and Michele Doust
PEBO, UTAH

Novell, Inc.'s \$350 million bid to buy Unix operating system from AT&T could dramatically alter the Unix landscape and strengthen Novell's challenge to Microsoft Corp.'s mid-1993 introduction of its Windows NT operating system, analysts and users agreed. The vendor's Dec. 21 announcement that it plans to acquire Unix System Laboratories, Inc. (USL) also has the potential to usher both Novell and Unix into more strategic roles in corporate information systems shops.

"We're in the process of putting together a Unix/Novell network ourselves, and this should make that a bit simpler," said Bob Musacchio, chief information officer at the American Medical Association in Chicago. The merger would also shore up Novell's historic weakness

on the high-end server side, where Unix is particularly strong. Musacchio and others pointed out.

"What is at stake here is the enterprise computing environment," said Niall Linton, an analyst and editor of the "Open Systems Advisor" newsletter, published in Boston. "Both Microsoft and Novell want



Ray Noorda: The Novell/USL deal meets customers' needs

very much to move beyond desktops and PC LANs into enterprise computing."

"This really says to Microsoft: 'OK, let's go head-to-head,'" added Judith Hurwitz, president of the Hurwitz Consulting Group in Newton, Mass. "Both of them will have OS-11, scalable operating systems that go from the desktop to the server level."

What began last year as an unlikely technology handshake between Novell and USL turned into a big of bear hug when Novell signed up to buy the Unix System V operating system. The courtship began in December 1991 with the formation

of Univix, Inc., the Novell/USL joint venture that shipped its first version of Univare three weeks ago. The new operating system will compete primarily against Windows NT, Sun Microsystems Inc.'s Solaris and IBM's OS/2.

Working together

By accelerating the integration of Unix and NetWare, the two companies hope to leverage their assets of expertise to appeal to users who are "upgrading" PC networks or downsizing applications from large proprietary systems to Unix-based servers and workstations.

USL President Rod Piper said they hope to stimulate development of more network-based Unix applications as well as provide customers with "a common management framework" that will reduce costs.

Novell President Ray Noorda added: "Customers have told me personally that it fits their ambitions; desires and expectations to have [UnixWare] work more closely with the Unix environment."

Noorda officials stressed that the company's deepening commitment to Unix will not interfere with its

Bethlehem Steel/EDS deal targets re-engineering

By Kim S. Nash
BETHLEHEM, PA.

Bethlehem Steel Corp.'s decision to outsource data processing to Electronic Data Systems Corp. marks the start of a huge business process re-engineering effort to better integrate plant floor automation with corporate-level systems. The steel maker, which reported \$190 million in losses for the first three quarters of 1992, claimed the decision to farm out information systems [CW, Dec. 21] is not "a slash and burn" fix designed to save money.

Most of any cost savings that Bethlehem Steel might see down the road will be "poured back into IT," said Walt Bargeron, vice president of information technology.

New business processes Bethlehem Steel wants to overhaul the way it does business now that it has divested itself of most nonsteel business units. EDS' manufacturing experience was key for Bargeron. "They could handle the scope of the project, so we'll be able to get into

new technologies faster," he said. For example, setting up a floor-side data highway between manufacturing facilities is high on Bargeron's agenda, as is applying artificial intelligence to core engineering activities.

The impetus to outsource came from top executives who challenged US in 1991 to "find better ways ... to manage," said Bargeron, who also oversees research and development and quality assurance, among other areas.

The "X-Steel mark," behind US Corp., then dropped a white hankie in front of several outsourcing suitors last January. The final choice came down to the wire as Bethlehem Steel made EDS face off against archival IBM subsidiary Integrated Systems Solutions Corp. (ISSC).

Twelve months of back-and-forth between Bethlehem Steel and EDS and ISSC meant "we got a good deal," Bargeron said.

The estimated \$300 million, 10-

year contract calls for EDS to start the following in Jan. 93:

- A six-month study of business processes with an eye toward re-engineering and downsizing from mainframe-based computing to a client/server setup.
- Evaluating the skills and talents of Bethlehem Steel's 450-member IS staff and training workers in EDS proprietary application development and productivity tools.
- Consolidating two IBM mainframe-anchored data centers to one EDS site in Camp Hill, Pa.

The contract contains several paragraphs that let Bethlehem Steel "retain a lot of control," said Howard Anderson, a consultant at The Yankee Group, which along with Price Waterhouse helped broker the deal.

For example, EDS did not buy Bethlehem Steel's data center. The steel maker plans to hold on to its \$3.4 million worth of equipment and will own any upgraded systems EDS may buy in the future, noted Gary Anderson, vice president for manufacturing and distribution services at EDS.

Bethlehem Steel's IS staff will be offered positions at EDS, and most are expected to take them, Bargeron said.

Michael and I
couldn't find
Bethlehem Steel
mainframe
information
the right way
to be used back
into IS

continued support of other desktop systems from IBM, Apple Computer, Inc., Microsoft and other vendors.

Users said they expect Novell to handle the transition gracefully.

"Novell usually does a good job with companies they acquire," said Jim Queen, local-area network manager at Enron Gas Corp. in Houston, which has 600 users of Windows 3.1 and Novell NetWare. "Who knows? Maybe two years from now there will be a compelling reason, and I will rip out all those Windows desktops for Unix. Novell's purchase of USL makes a lot more likely."

The highlights of the deal are the following:

- Novell will own the Unix System V operating system but will keep USL as a separate subsidiary company to license Unix source and binary code.

- All aspects of USL's early access and general availability programs for its Unix System V licenses will remain unchanged.

- Novell will continue marketing Uniware, the integrated version of Novell NetWare and the Unix System V, Release 4.2 "Devoting" operating system.

Among Unix software vendors, the potential merger was cause for celebration. "This is a very early acquisition," said D. J. Long, vice president of marketing at Western Mass.-based Applix, Inc., which develops Unix-based office integration software. "It puts an aggressive, highly successful software development company behind Unix."

Credibility boost

Along with improved marketing and expanded distribution channels, Novell might also lead Unix some much-needed credibility with the PC half of the computer industry, analysts said.

Unix System V is the dominant Unix "flavor" to a worldwide market valued at \$18 billion in

Unix source control

Planned by the Novell/USL merger

Novell, The 1993

million revenue

software company,

which means

operating system

commands two-thirds

of the PC LAN market.

Novell's

information

development and marketing

of the Unix System V

operating system

is being controlled by

AT&T and its other

shareholders, several

months before Novell

formed its December

split by Novell and USL

to market Uniware, a

novelty operating

system that integrates

Unix System V Release

4.2 with third

parties. Despite

staying close, A

data international, a

novelty organization

of more than 100 Unix

System V vendors and

large users, Novell

has been evaluating

of Unix System V,

AT&T, developer of the

Unix operating system.

1991. Sun, for example, has based its new Solaris 2 operating system on Unix System V, Release 4. Other USL licensees include AMDahl Corp., Toshiba Corp., Motorola, Inc. and The Santa Cruz Operation (SCO).

"We see Novell as a good shepherd for Unix technology in the future," said Scott McGregor, general manager of the products business unit at SCO, the largest USL licensee.

Not all roses

There is a definite downside, however, to having one large software company own the Unix operating system rather than a dozen shareholders companies that must achieve consensus on future development.

The acquisition is bound to cause competitive clashes for USL and licensees such as Sun. The workstation vendor buys core Unix technology from USL to build Solaris. However, it must now count Uniware among its enemies. Several analysts emphasized that Novell will be in the driver's seat for setting Unix priorities from now on.

"It would be naive to believe a company is going to spend \$350 million and then not control the technology," said Steve Wendler, an analyst at Gartner Group, Inc. in Stamford, Conn.

Not other analysts said Novell understands the "power relationship" — or what Novell itself calls "cooperation" — better than AT&T or any of the large system vendors ever did.

"Novell has to maintain the momentum for Unix as a viable open systems environment," said Kevin O'Neill, an analyst at Business Research Group in Newton, Mass.

Without providing specific product plans, Novell officials indicate that the two operating systems will become more closely entwined over time. USL software such as the Tuxedo transaction processing system and other application services will be layered onto future versions of NetWare, they said.



Novell

- Plan: Strengthen position in client/server enterprise computing; controls future development of Unix System V, provides more credits contributions to Microsoft's Windows NT.

- Minus: Probably overpaid for USL at \$350 million.

Unix System Licensees

- Plan: Broaden distribution channels; improve marketing efforts.

- Minus: Owned by single vendor instead of AT&T and its shareholder companies; can no longer claim "vendor-neutral" status.

System V Licensees

- Plan: Improves credibility of Unix as strategic operating system for commercial markets.

- Minus: Less influence in setting priorities for future Unix development.

Open Software Foundation

- Plan: Opportunity to win over disgruntled System V licensees to OS/2 technologies.

- Minus: Novell NetWare competition fierce against OS/2 Distributed Computing Environment on client desktops.

Unix International

- Plan: Stronger Unix market benefits all member companies.

- Minus: Future role unclear in shaping Unix direction.

By Cheryl Lee-Mason

Corrections

A story in the Dec. 14 issue should have said Granite Computer Products, Inc. is affiliated with ComputerLand Corp., while Insight Distribution, Inc. is affiliated with MicroAge, Inc.

A news story in the Dec. 14 issue incorrectly cited the model number of the IBM mainframe for which Camtec Corp.'s memory is intended. The correct number is Enterprise Systems/Model 9021.

Apertus Technology, Inc. in Eden Prairie, Minn., was accidentally deleted from a case study on Pacific Bell's new expert system application in the Nov. 23 issue.

News Shorts

Fare fixing charged

The U.S. Department of Justice charged eight airlines with fixing prices by using secret codes in their electronic fare system. All of the airlines denied the charge, but US Air and United Airlines signed consent decrees agreeing to avoid electronic price fixing. The other six airlines, including American Airlines and Delta Air Lines, said they will fight the charges in court.

IBM taps former execs

IBM has hired two former senior executives as consultants to Chairman John Akers to help strengthen the company's fledgling business units. The two executives are Paul Rizzo, known by analysts as a finance and planning expert, and Kasper Cassani, who headed IBM's world trade division before retiring in 1989.

Oracle profits rise

Citing strong sales in both Unix and desktop software, Oracle Corp. posted second-quarter earnings of \$83 million, up 54% from the same period a year ago. Revenue was \$353 million, up 24% from the same period last year. "It's [a] far stronger [report] than anyone anticipated, and the accounting was very conservative," said Terence Quinn, a senior vice president at Kidder, Peabody & Co. in New York. While

Unix sales were 56% higher than they were a year ago, Oracle reported declining sales of its database management system and tools for proprietary systems, including IBM mainframes and minicomputers.

3Com to acquire hub vendor

3Com Corp. has agreed to acquire Rite-Tek, Inc., a \$20 million Norboro, Mass.-based Token Ring wiring hub vendor. 3Com said it expects the deal to be completed before the end of this month. Separately, 3Com posted third-quarter profits of \$7.5 million, an increase of 185% from the same period last year. Revenue was \$147.5 million, up 34% from the year-earlier period.

Integrator bolsters management

Technology Solutions Co. scored a coup by bringing another Andersen Consulting alumni into its senior management ranks. The Chicago-based systems integrator named Paul J. Cosgrove, 42, a member of its board and executive vice president in charge of its New York office. For the past 11 months, Cosgrove was chief executive officer at AGS Computers, Inc., Nynex Corp.'s systems integration subsidiary. He joins ex-Andersen partner Melvin E. Bergstein, who is Technology Solutions' co-CEO. Replacing Cosgrove at AGS Computers is Matt Stover, who was vice president of corporate communications.

Cellular data dispute persists

Networking company Microcom, Inc. in Nor-

wood, Mass., has filed an answer and counterclaims to a patent litigation brought against it by cellular data technology patent holder Spectrum Information Technologies, Inc. Spectrum's technology allows data to travel over analog cellular networks (ENR, Dec. 14), a function inherent in Microcom's cellular models. While Spectrum has used Microcom's patent infringement and nonpayment of licensing fees and royalties, Microcom seeks to have the patent invalidated on the grounds that the technology was in use before Spectrum's filing of a patent application.

SHORT TAKES Eastman Kodak Co. agreed to sell Chicago-based Interactive Systems Corp., a Unix systems consultancy, to Ottawa, Ont.-based SRL Systemhouse, Inc. To avoid confusion with Information Builders, Inc.'s Focus, IBM has renamed its LANPower Management/2 family of local-area network systems management products "LAN NetView." IBM belatedly up its recently formed retail and store systems group with the purchase of former business partner Worldwide Chain Store Systems, Inc. in Chicago for an undisclosed amount. The company develops retail and wholesale distribution software for IBM's Application Systems/400, RISC System/6000 and System/6000 computers. Beta-test versions of OS/2 Version 2.1 are available to interested users. The new version of OS/2 reportedly contains support for Microport Corp.'s Windows 3.1, a 32-bit graphics engine and enhanced driver support.

Gee, maybe we can get Ronald McDonald wallpaper for the kids' rooms



In case you don't get enough ads on TV, now you can get the Energizer Bunny to crawl across your computer screen.

The package — the brainchild of a company called PC Dynamics — even comes with fully digitized sound clips, just in case you wanted to hear that drum keep going and going and going...

Gives a whole new meaning to the term strap-on



▲ Lap Strap, a sort of thigh tourniquet that can act as an impromptu desk-on-your-leg for PC zealots.



The head of the worst boss you. Compiled by Carol Woodward. Illustrations and design by Janet Gervasio.

Aren't programmers childlike enough?

Anzoid in Stow, Mass., is offering a toy called Objects essentially a set of building blocks for bored programmers who want to rediscover their inner child. The brochure that accompanies it says, "When they fall down, you can say OOPS." On-site support is provided "anywhere that's fun to visit."



Hey! What do they use the farm subsidies for, then?

Congressional auditors reported last summer that the Farmers Home Administration had spent \$200 million since 1985 to automate its field office operations but still managed its \$57 billion loan portfolio by thumbing through boxes of color-coded index cards.

What's next? Point-of-sale zucchini?

Intermec Corp., in conjunction with the Washington State Department of Fisheries, has helped develop a bar-code pattern that is being "naturally" encoded in the earbone of fish.



Business as usual?

Sen. John Glenn (D-Ohio): This fee "will most likely be pointless, and ultimately embarrassing, because it simply will not work." (Speaking on the U.S. Congress' decision to assess a whopping 46 cents/min. on-line charge for users of a federal database of shipping tariffs. That's twice the cost of similar services from the private sector.)



Paul predicts



A wacky look at the events ahead in 1993 by Executive Editor Paul Gilkin.

The news, more honest IBM will declare 1993 "The year of solving our problems rear end." Struggling computerizer error at DEC will dub '93 "The year of rear-ending some dead-weight products," while a weakened Wang will exclaim "The year we sell off what's left of our rear end."

>The spreadsheet wars will conclude with Borland's declaration that Version 2 of Quattro Pro for Windows will have a menu item that guarantees world peace. Lotus will angrily insist that it was going to put the exact same feature in 1-2-3. And it will be discovered that Microsoft had quietly put the same feature in Excel but had "forgotten" to tell independent software vendors.

>IBM will claim that 1,500 applications have been written for

OS/2. However, further analysis will reveal that 1,500 of these are screen savers.

>Computer Associates will shake up the software industry with a revamped 8-cm-disk deal that makes it possible for large customers to purchase the entire suite of CA data center products for \$19.99, plus tax. However, annual maintenance fees will run in excess of \$2.5 million.

>A prominent CIO will quit to join a con-



sultancy, deeming that the complete elimination of his department and budget played any role in his decision.

>Storage Tek will say that it still has a few tiny problems with its Isobry disk array — like it doesn't work — and that it can't forecast a ship date

until the Sears repairman shows up.

>Microsoft will continue to complain that it doesn't understand why its competitors hate it, even though it takes about 80% of every market it enters.

>The Federal Trade Commission will deter-

mine that Microsoft does compete unfairly, but it will drop charges after it receives a free site license for Microsoft Gold.

>The PC software price wars will reach a fever pitch, with Microsoft offering to bundle a free support technician with each Microsoft Office pack.

>IBM will be reduced to holding its annual ADVcycle user-group meeting at booth 12 in a Chinese restaurant in New York.

>Saying that it no longer considers its parent company "a strange beast," EDS will reassure General Motors.

>With mainframe sales stalled, IBM will introduce in a late-

warm reception a credit card that makes a contribution equaling 9% of each customer's payments toward the purchase price of an RS/6000.

>CA will introduce a database product that its users can employ to keep track of the number of database products CA now sells.

>Toshiba will proudly announce that it has developed a portable computer so small that nobody can use it.

>Nearly every product upgrade during the year will make the product object-oriented, standard-based, SQL-compatible, completely open, GUI-capable and customer-driven and will enable a paradigm shift. Most of these products will be bug fixes.

Why Ingres can cut your applications development time by 60%.

Imagine an application that took two years just to prototype. Now imagine creating the fully functional version in only three months. That's what one of our customers did using Ingres' extraordinary development tools.

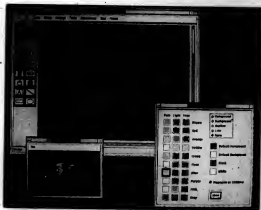
First, there's INGRES/Vision.[™] It gives you a visual interface and 4GL code-generating technology that actually writes code for you. Next, there's INGRES/Windows4GL,[™] which lets you create graphical client-server applications by simply pointing and clicking. That cuts development time by an average of 60%.



Anders Nicolasson, National Systems Manager,
Construction Market Data, Inc., 250 employees
in 15 US offices.

"The database we collect, massage, and manipulate to generate reports for clients is our business. The demand for new applications obviously is intense. I've been able to meet that demand with INGRES/Vision. On many projects, it's cut development time by 75 percent.

"Ingres' technical support is also incredibly responsive. No matter when I call, their support engineers always call back right away."



With INGRES/Windows4GL, GUI applications written in one environment can be deployed across all major windowing environments, without recoding.

Since its beginnings at U.C., Berkeley, Ingres has built a strong record of technological leadership. As Marilyn Bohl, Senior VP for Worldwide Engineering, explains, "Ingres has a long history of firsts. Furthermore, we have gone far beyond simply pioneering new database and tools technologies. We translate our technology into practical, useful products like INGRES/Vision and INGRES/Windows4GL.

"By focusing on the underlying architecture of the database and how to achieve optimal connectivity to it, Ingres is able to maximize the power and performance of

Firsts achieved by Ingres	
1982	First client-server RDBMS
1985	First RDBMS-4GL integration
1986	First database gateway
1987	First transparent distributed RDBMS
1988	First UNIX DBMS to break 8M TPS
1989	First intelligent database, object support
1990	First RDBMS with automatic two-phase commit
1990	First RDBMS-graphical, OO 4GL integration
1991	First production-quality 4GL generator
1991	First SQL-based event scheduler

open systems, and to provide the best possible framework for your move toward client-server computing. The result is a system architecture that mirrors the way your business works, and solves business problems."

If you'd like to know more about the effect Ingres can have on your productivity, call 1-800-4-INGRES. Within Latin America, call 1-305-789-6685.

 **Ingres**

GA-875

New!
Paradox 4.0

Paradox is fastest!

Test results (*InfoWorld*, September 1992) prove that new Paradox® 4.0 is the world's fastest relational database! Thanks to Borland's new WarpSpeed™ performance, Paradox 4.0 sets a new standard for both network and standalone performance. For you this means faster answers to queries, faster data access, and faster multiuser applications.*

New Windows-like interface

A new Windows-like interface makes using Paradox 4.0 more intuitive than any other database. The context-sensitive SpeedBar™ gives you instant access to your frequently used commands and features. Movable, resizable windows, pull-down menus, dialog boxes, and mouse support make creating and editing your database simple.

The fastest QBE yet

You'll move through your work faster with Paradox 4.0's built-in query optimizer. It enhances QBE by automatically finding the fastest path to the answers you're seeking. Plus, multi-table forms and reports make everything from data entry to presentations a snap—all without programming.

New! Memo fields

Paradox 4.0 comes with new, all-purpose memo fields that allow you to add virtually

More than 25% faster!

Paradox is #1 in performance!

*Test time to completion of query. Worst case database performance tests: Paradox, 14:49:30; FoxPro, 32:08:13.

"Tuned-up Paradox 4.0 speeds past FoxPro 2.0."

InfoWorld product comparison, September 28, 1992.

unlimited text anywhere in your application. Plus you can store anything you want in the new binary field—documents, bit-mapped graphics, multimedia data—and manipulate it under program control.

SQL connectivity

Paradox 4.0 and Paradox SQL Link™ provide the most SQL connections of any PC relational database. You can seamlessly access data on remote SQL database servers and then work with it using Paradox's features like QBE, reports, and more.

More powerful applications

PAL™ (Paradox Application Language) is a powerful, high-level language that lets users create sophisticated applications fast. And new PAL features let users build custom applications that incorporate mouse control, pull-down and pop-up menus, dialog boxes with push buttons, and more.

So when you feel the need for speed, go with Borland's new Paradox 4.0.

Put the world's most advanced database to work for you—FAST!

To upgrade or order, see your dealer today or call
1-800-331-0877, ext. 5530
In Canada, call 1-800-461-3327

Call now!



B O R L A N D

Software Craftsmanship

*Each additional user requires Paradox LAN Pack, sold separately. †Paradox SQL Link sold separately. Copyright © 1992 Borland International, Inc. All rights reserved. All Borland product names are trademarks of Borland International, Inc. ® SI 4892